Operating Manual

AMAZONE

UX 3200 Super
UX 4200 Super
UX 5200 Super
UX 6200 Super

Trailed field sprayer

MG3403
BAG0054.8 09.15
Printed in Germany

Please read this operating manual before commissioning. Keep it in a safe place for future use.

en

Reading the instruction

Manual and following it should seem to be inconvenient and superfluous as it is not enough to hear from others and to realize that a machine is good, to buy it and to believe that now everything should work by itself. The person in question would not only harm himself but also make the mistake of blaming the machine for possible failures instead of himself. In order to ensure success one should enter the mind of a thing, make himself familiar with every part of the machine and get acquainted with how it's handled. Only in this way could you be satisfied both with the machine and with yourself. This goal is the purpose of this instruction manual.

Leipzig-Plagwitz 1872. Rud. Sark.

Identification data

Manufacturer:	AMAZONEN-WERKE H. DREYER GmbH & Co. KG
Machine ID no.:	
Type:	UX 3200, UX 4200, UX 5200, UX 6200
Permissible system pressure (bar)	Maximum 10 bar
Year of manufacture:	
Factory:	
Basic weight (kg):	
Permissible total weight (kg):	
Maximum load (kg):	

Manufacturer's address

AMAZONEN-WERKE
H. DREYER GmbH & Co. KG
Postfach 51
D-49202 Hasbergen, Germany
Tel.: + 49 (0)5405 501-0
E-mail: amazone@amazone.de

Spare part orders

Spare parts lists are freely accessible in the spare parts portal at www.amazone.de.

Please send orders to your AMAZONE dealer.

Formalities of the operating manual

Document number:	MG3403
Compilation date:	09.15

© Copyright AMAZONEN-WERKE H. DREYER GmbH & Co. KG, 2015

All rights reserved.

Reprinting, even of extracts, is only possible with the approval of AMAZONEN-WERKE H. DREYER GmbH & Co. KG.

Foreword

Dear Customer,

You have chosen one of the quality products from the wide product range of AMAZONEN-WERKE, H. DREYER GmbH & Co. KG. We thank you for your confidence in our products.

On receiving the machine, check to see if it has been damaged during transport or if parts are missing. Using the delivery note, check that the machine has been delivered in full, including any special equipment ordered. Damage can only be rectified if problems are signalled immediately.

Before commissioning, read and understand this operating manual, and particularly the safety information. Only after careful reading will you be able to benefit from the full scope of your newly purchased machine.

Please ensure that all the machine operators have read this operating manual before the machine is commissioned.

Should you have any questions or problems, please consult this operating manual or contact your local service partner.

Regular maintenance and timely replacement of worn or damaged parts increases the lifespan of your machine.

User evaluation

Dear Reader,

We update our operating manuals regularly. Your suggestions for improvement help us to create ever more user-friendly manuals.

AMAZONEN-WERKE

H. DREYER GmbH & Co. KG

Postfach 51

D-49202 Hasbergen, Germany

Tel.: + 49 (0)5405 501-0

E-mail: amazone@amazone.de

1 User Information 10
1.1 Purpose of the document 10
1.2 Locations in the operating manual 10
1.3 Diagrams 10

2 General safety instructions 11
2.1 Obligations and liability 11
2.2 Representation of safety symbols 13
2.3 Organisational measures 14
2.4 Safety and protection equipment 14
2.5 Informal safety measures 14
2.6 User training 15
2.7 Safety measures in normal operation 15
2.8 Danger from residual energy 16
2.9 Maintenance and repair work, fault elimination 16
2.10 Design changes 16
2.10.1 Spare and wear parts and aids 17
2.11 Cleaning and disposal 17
2.12 User workstation 17
2.13 Warning symbols and other signs on the machine 18
2.13.1 Positions of warning symbols and other labels 19
2.14 Potential risks from not observing the safety instructions 28
2.15 Safety-conscious working 28
2.16 Safety information for users 29
2.16.1 General safety and accident prevention information 29
2.16.2 Hydraulic system 32
2.16.3 Electrical system 33
2.16.4 Universal joint shaft operation 34
2.16.5 Coupled machines 35
2.16.6 Brake system 35
2.16.7 Tyres 36
2.16.8 Field sprayer operation 37
2.16.9 Cleaning, maintenance and repairs 38

3 Loading and unloading 39

4 Product description 40
4.1 Overview of the assemblies 40
4.2 Safety and protection equipment 42
4.3 Liquid circuit 43
4.4 Supply hoses between the tractor and the machine 44
4.5 Transportation equipment 44
4.6 Intended use 45
4.7 Device inspections 46
4.8 Consequences of using certain crop protection agents 46
4.9 Danger areas and danger points 47
4.10 Rating plate and CE mark 48
4.11 Conformity 48
4.12 Maximum permissible application rate 49
4.13 Technical Data 50
4.13.1 Total **UX** measurements including **Super-S** sprayer boom [mm] 50
4.13.2 Total **UX** measurements including **Super-L** sprayer boom [mm] 50
4.13.3 Data sheet 51
4.13.4 Weights basic machine and modules 52
4.13.5 Permissible total weight and tyres 53

4.14 Noise emissions data ... 56
4.15 Required tractor equipment ... 57
5 Construction and function of the basic machine ... 58
5.1 Functionality ... 58
5.2 Control terminal ... 59
5.3 PTO shaft ... 62
5.3.1 Coupling the PTO shaft ... 64
5.3.2 Uncoupling the PTO shaft ... 65
5.4 Hydraulic connections ... 66
5.4.1 Coupling hydraulic hose lines ... 68
5.4.2 Disconnecting hydraulic hose lines ... 68
5.5 Air pressure brake system ... 69
5.5.1 Automatic load-dependent braking force regulator (ALB) ... 70
5.5.2 Coupling the brake system ... 71
5.5.3 Uncoupling the brake system ... 72
5.6 Hydraulic service brake system ... 73
5.6.1 Coupling the hydraulic service brake system ... 73
5.6.2 Uncoupling the hydraulic service brake system ... 73
5.6.3 Emergency brake ... 73
5.7 Parking brake ... 75
5.8 Foldable wheel chocks ... 76
5.9 Safety chain for implements without brake system ... 77
5.10 Drawbars ... 78
5.11 AutoTrail tracking control ... 79
5.11.1 AutoTrail steering drawbar ... 81
5.11.2 AutoTrail steering axle ... 82
5.12 Tracking control via tractor control unit ... 83
5.13 Hydraulic stand ... 84
5.14 Mechanic stand ... 84
5.15 Spray liquid tank ... 85
5.15.1 Fill level indicator on the machine ... 86
5.15.2 Agitators ... 86
5.15.3 Maintenance platform with ladder ... 87
5.15.4 Suction port for filling the spray liquid tank (optional) ... 88
5.15.5 Filling connection for filling the spray liquid tank with pressure (option) ... 88
5.16 Flushing water tank ... 89
5.17 Induction bowl with canister flushing ... 90
5.18 Filling connection for Ecofill (optional) ... 91
5.19 Fresh water tank ... 92
5.20 Hydropneumatic sprung suspension (optional) ... 92
5.21 Pump equipment ... 93
5.21.1 Hydraulic pump drive ... 93
5.22 Filter equipment ... 94
5.22.1 Filling sieve ... 94
5.22.2 Suction filter ... 94
5.22.3 Self cleaning pressure filter ... 95
5.22.4 Nozzle filters ... 95
5.22.5 Bottom sieve in the induction bowl ... 96
5.23 Drawbar (optional) ... 96
5.24 Transport and secure container (optional) ... 97
5.25 Exterior wash down kit (optional) ... 98
5.26 Camera (optional) ... 99
5.27 Work floodlights ... 100
5.28 Comfort equipment ... 101
5.29 Control terminal ... 102

5.30 **AMASPRAY+** ... 102

6 Construction and function of the sprayer boom ... 103

6.1 **Super-S** boom ... 107
6.1.1 Unlocking and locking the transport safety catch ... 108
6.1.2 **Super-S** boom, folding via the tractor control unit ... 109
6.2 **Super-L** boom ... 110
6.2.1 **Super-L** boom, folded using tractor control unit ... 112
6.3 Working with the sprayer boom folded out on one side ... 113
6.4 Reduction joint on the outer boom (optional) ... 114
6.5 Boom width reduction (option) ... 115
6.6 Boom extension (option) ... 116
6.7 Hydraulic tilt adjustment (optional) ... 117
6.8 Distance control (optional) ... 117
6.9 Spray lines and nozzles ... 118
6.9.1 Technical data ... 118
6.9.2 Single nozzles ... 121
6.9.3 Multi nozzles (optional) ... 121
6.9.4 Electric boundary nozzles (optional) ... 123
6.9.5 Electric end nozzle switching (optional) ... 123
6.9.6 Electric additional nozzle switching (optional) ... 123
6.10 Line filter for spray lines (optional) ... 124
6.11 Automatic single nozzle control (optional) ... 124
6.11.1 Single nozzle control AmaSwitch ... 124
6.11.2 4-way AmaSelect single nozzle control ... 124
6.12 Special optional equipment for liquid fertiliser ... 125
6.12.1 Three-ray nozzles (optional) ... 125
6.12.2 7 hole nozzles / FD nozzles (optional) ... 126
6.12.3 Drag hose equipment for **Super-S** boom (optional) ... 127
6.12.4 Drag hose equipment for **Super-L** boom (optional) ... 128
6.13 Foam marker (optional) ... 129
6.14 Pressure circulating system (DUS) (optional) ... 131
6.15 Lift module ... 133

7 Commissioning ... 134

7.1 Checking the suitability of the tractor ... 135
7.1.1 Calculating the actual values for the total tractor weight, tractor axle loads and tyre load capacities, as well as the minimum ballast ... 135
7.1.2 Requirements for tractor operation with attached machines ... 139
7.1.3 Machines without their own brake system ... 140
7.2 Adjusting the length of the PTO shaft to the tractor ... 141
7.3 Securing tractor / machine against accidental starting and rolling ... 143
7.4 Fitting wheels ... 144
7.5 Initial operation of service brake system ... 144
7.6 Adjusting the system setting screw on the hydraulic block ... 145
7.7 AutoTrail position encoder ... 146
7.8 Track setting of the adjustable axle (workshop task) ... 147

8 Coupling and uncoupling the machine ... 148

8.1 Coupling the machine ... 148
8.2 Uncoupling the machine ... 150
8.2.1 Manoeuvring the uncoupled machine ... 151

9 Transportation ... 152

10 Using the machine ... 154

10.1 Preparing for spraying operation ... 156
10.2 Preparing the spray liquid ... 157

10.2.1 Calculating the filling and refill quantity 161
10.2.2 Filling table for remaining spray area 162
10.2.3 Fill the spray liquid tank via the suction port and blend in the agent at the same time 163
10.2.4 Adding the agent using ECO-Fill 166
10.2.5 Filling the spray liquid tank via the filling connection and blending in the agent 167
10.3 Spraying operation 170
10.3.1 Applying the spray liquid 172
10.3.2 Drift reduction measures 174
10.3.3 Dilute the spray liquid with flushing water 174
10.4 Residues 175
10.4.1 Diluting the excess residue in the spray liquid tank and spraying out the diluted residue remaining at the end of spraying operations 176
10.4.2 Emptying the spray liquid tank using the pump 177
10.5 Cleaning the field sprayer 178
10.5.1 Cleaning the sprayer with the tank empty 179
10.5.2 Draining the final residues 180
10.5.3 Cleaning the suction filter when tank is empty 181
10.5.4 Cleaning the suction filter when tank is full 181
10.5.5 Cleaning the pressure filter when the tank is empty 182
10.5.6 Cleaning the pressure filter when the tank is full 182
10.5.7 Exterior cleaning 183
10.5.8 Cleaning the sprayer during a critical agent change 183
10.5.9 Cleaning the sprayer with a full tank (work interruption) 184

11 Faults 185

12 Cleaning, maintenance and repair 186

12.1 Cleaning 188
12.2 Winter storage and long periods out of operation 189
12.3 Lubrication specifications 192
12.3.1 Lubrication point overview 193
12.4 Maintenance schedule – overview 196
12.5 Drawbars 198
12.6 Axle and brake 199
12.6.1 Automatic load-dependent brake force regulator (ALB) 204
12.7 Parking brake 204
12.8 Tyres / wheels 205
12.8.1 Tyre pressures 205
12.8.2 Fitting tyres 205
12.9 Hydropneumatic sprung suspension 206
12.10 Drawbar 206
12.11 Hydraulic system 207
12.11.1 Labelling hydraulic hose lines 208
12.11.2 Maintenance intervals 208
12.11.3 Inspection criteria for hydraulic hose lines 208
12.11.4 Installation and removal of hydraulic hose lines 209
12.11.5 Fluid filter 210
12.11.6 Cleaning the solenoid valves 210
12.11.7 Clean / exchange the filter in the hydraulic plug 211
12.11.8 Adjusting the hydraulic throttle valve 212
12.12 Adjustments on the folded-out sprayer boom 214
12.13 Pump 215
12.13.1 Check the oil level 215
12.13.2 Changing the oil 215
12.13.3 Cleaning 215
12.13.4 Belt-driven pump 216
12.13.5 Checking and replacing the suction and pressure-side valves 217
12.13.6 Checking and replacing the piston diaphragm 218
12.14 Calibrate the flow meter 219

12.15 Field sprayer calibration 220
12.16 Nozzles 222
12.16.1 Fitting the nozzle 222
12.16.2 Removing the diaphragm valve if the nozzle is dripping 222
12.17 Line filter 223
12.18 Instructions on testing the field sprayer 224
12.19 Electric lighting system 225
12.20 Screw tightening torques 226
12.21 Disposing of the field sprayer 227

13 Spray table 228

13.1 Spray tables for flat-fan, anti-drift, injector and airmix nozzles, spraying height 50 cm 228
13.2 Spraying nozzles for liquid manure 232
13.2.1 Spray table for three-ray nozzle, spraying height 120 cm 232
13.2.2 Spray table for 7-hole nozzles 234
13.2.3 Spray table for FD nozzles 235
13.3 Spray table for drag hose unit 237
13.4 Conversion table for spraying ammonium nitrate / urea solution (AUS) liquid fertiliser 239

1 User Information

The User Information section provides information on use of the operating manual.

1.1 Purpose of the document

This operating manual

- describes the operation and maintenance of the machine.
- provides important information on safe and efficient handling of the machine.
- is a component part of the machine and should always be kept with the machine or the towing vehicle.
- Keep it in a safe place for future use.

1.2 Locations in the operating manual

All the directions specified in the operating manual are always seen in the direction of travel.

1.3 Diagrams

Instructions and responses

Activities to be carried out by the user are given as numbered instructions. Always keep to the order of the instructions. The response to an instruction is given by an arrow. Example:

1. Instruction 1

→ Machine response to instruction 1

2. Instruction 2

Lists

Lists without an essential order are shown as a list with bullets. Example:

- Point 1
- Point 2

Item numbers in diagrams

Numbers in round brackets refer to items in diagrams. The first number refers to the diagram and the second number to the item.

Example: (Fig. 3/6)

- Figure 3
- Item 6

2 General safety instructions

This section contains important information on safe operation of the machine.

2.1 Obligations and liability

Comply with the instructions in the operating manual

Knowledge of the basic safety information and safety regulations is a basic requirement for safe handling and fault-free machine operation.

Obligations of the operator

The operator is obliged only to let those people work with/on the machine who

- are aware of the basic workplace safety information and accident prevention regulations.
- have been instructed in working with/on the machine.
- have read and understood this operating manual.

The operator is obliged

- to keep all the warning symbols on the machine in a legible state.
- to replace damaged warning symbols.

Obligations of the user

Before starting work, anyone charged with working with/on the machine is obliged

- to comply with the basic workplace safety instructions and accident prevention regulations.
- to read and follow the "General safety information" section of this operating manual.
- to read the section "Warning symbols and other labels on the machine" (page 18) of this operating manual and to follow the safety instructions represented by the warning symbols when operating the machine.
- If you still have queries, please contact the manufacturer.

Risks in handling the machine

The machine has been constructed to the state-of-the art and the recognised rules of safety. However, operating the machine may cause risks and restrictions to

- the health and safety of the user or third parties,
- the machine,
- other property.

Only use the machine

- for the purpose for which it was intended.
- in a perfect state of repair.

Eliminate any faults immediately which could impair safety.

Guarantee and liability

Our "General conditions of sales and delivery" are always applicable. These shall be available to the operator, at the latest on conclusion of the contract. Guarantee and liability claims for damage to people or property will be excluded if they can be traced back to one or more of the following causes:

- Improper use of the machine.
- Improper installation, commissioning, operation and maintenance of the machine.
- Operation of the machine with defective safety equipment or improperly attached or non-functioning safety equipment.
- Non-compliance with the instructions in the operating manual regarding commissioning, operation and maintenance.
- Unauthorised design changes to the machine.
- Insufficient monitoring of machine parts which are subject to wear.
- Improperly executed repairs.
- Disasters through the impact of foreign bodies and Acts of God.

2.2 Representation of safety symbols

Safety instructions are indicated by the triangular safety symbol and the highlighted signal word. The signal word (danger, warning, caution) describes the severity of the risk, and carries the following meaning:

DANGER

Indicates an immediate high risk which will result in death or serious physical injury (loss of body parts or long term damage) if not avoided.

If the instructions are not followed, then this will result in immediate death or serious physical injury.

WARNING

Indicates a medium risk, which could result in death or (serious) physical injury if not avoided.

If the instructions are not followed, then this may result in death or serious physical injury.

CAUTION

Indicates a low risk which could cause minor or medium level physical injury or damage to property if not avoided.

IMPORTANT

Indicates an obligation to special behaviour or an activity required for proper machine handling.

Non-compliance with these instructions can cause faults on the machine or disturbance to the environment.

NOTE

Indicates handling tips and particularly useful information.

These instructions will help you to use all the functions of your machine in the best way possible.

2.3 Organisational measures

The operator must provide the necessary personal protective equipment as per the information provided by the manufacturer of the crop protection agent to be used, such as:

- Chemical-resistant gloves,
- Chemical-resistant overalls,
- Water-resistant footwear,
- A face mask,
- Breathing protection,
- Safety glasses;
- Skin protection agents, etc.

The operating manual

- must always be kept at the place at which the machine is operated.
- must always be easily accessible for the user and maintenance personnel.

Check all safety equipment regularly.

2.4 Safety and protection equipment

Before starting up the machine each time, all the safety and protection equipment must be properly attached and fully functional. Check all safety and protection equipment regularly.

Faulty safety equipment

Faulty or disassembled safety and protection equipment can lead to dangerous situations.

2.5 Informal safety measures

As well as all the safety information in this operating manual, comply with the general, national regulations pertaining to accident prevention and environmental protection.

When driving on public roads and routes you should comply with the statutory road traffic regulations.

2.6 User training

Only those people who have been trained and instructed may work with/on the machine. The operator must clearly specify the responsibilities of the people charged with operation and maintenance work.

People being trained may only work with/on the machine under the supervision of an experienced person.

Activity \ Person	Person specially trained for the activity[1)]	Trained operator[2)]	Persons with specialist training (specialist workshop*)[3)]
Loading/Transport	X	X	X
Commissioning	--	X	--
Set-up, tool installation	--	--	X
Operation	--	X	--
Maintenance	--	--	X
Troubleshooting and fault elimination	X	--	X
Disposal	X	--	--

Legend: X..permitted --..not permitted

1) A person who can assume a specific task and who can carry out this task for an appropriately qualified company.

2) Instructed persons are those who have been instructed in their assigned tasks and in the possible risks in the case of improper behaviour, have been trained if necessary, and have been informed about the necessary protective equipment and measures.

3) People with specialist technical training shall be considered as a specialist. Due to their specialist training and their knowledge of the appropriate regulations, they can evaluate the work with which they have been charged and detect possible dangers.

Comment:

A qualification equivalent to specialist training can be obtained from several years' experience in the relevant field.

If maintenance and repair work on the machine is additionally marked "Workshop work", only a specialist workshop may carry out such work. The personnel of a specialist workshop shall possess the appropriate knowledge and suitable aids (tools, lifting and support equipment) for carrying out the maintenance and repair work on the machine in a way which is both appropriate and safe.

2.7 Safety measures in normal operation

Only operate the machine if all the safety and protection equipment is fully functional.

Check the machine at least once a day for visible damage and check the function of the safety and protection equipment.

2.8 Danger from residual energy

Note that there may be residual mechanical, hydraulic, pneumatic and electrical/electronic energy on the machine.

Use appropriate measures to inform the operating personnel. You can find detailed information in the relevant sections of this operating manual.

2.9 Maintenance and repair work, fault elimination

Carry out prescribed setting, maintenance and inspection work in good time.

Secure all media such as compressed air and the hydraulic system against unintentional start-up.

Carefully fix and secure larger assemblies to lifting gear when carrying out replacement work.

Regularly check that bolted connections are firmly secured and tighten if necessary.

When the maintenance work is completed, check the function of the safety devices

2.10 Design changes

You may make no changes, expansions or modifications to the machine without the authorisation of AMAZONEN-WERKE. This also applies when welding support parts.

Any expansion or modification work shall require the written approval of AMAZONEN-WERKE. Only use modification and accessory parts approved by AMAZONEN-WERKE so that the type approval, for example, remains valid in accordance with national and international regulations.

Vehicles with an official type approval or with equipment connected to a vehicle with a valid type approval or approval for road transport according to the German road traffic regulations must be in the state specified by the approval.

WARNING

Risk of crushing, cutting, being trapped or drawn in, or impact through the failure of support parts.

It is strictly forbidden to

- drill holes in the frame or on the running gear.
- increase the size of existing holes on the frame or the running gear.
- weld support parts.

2.10.1 Spare and wear parts and aids

Immediately replace any machine parts which are not in a perfect state.

Only use genuine AMAZONE spare and wear parts, or those approved by AMAZONEN-WERKE, so that the type approval remains valid according to the national and international regulations. The use of spare and wear parts from third parties does not guarantee that they have been constructed in a way as to meet the requirements placed on them.

AMAZONEN-WERKE shall accept no liability for damage caused by the use of non-approved spare and wear parts or aids.

2.11 Cleaning and disposal

Handle and dispose of any materials used carefully, in particular

- when carrying out work on lubrication systems and equipment and
- when cleaning using solvents.

2.12 User workstation

The machine may only be operated by one person sitting in the driver's seat of the tractor.

2.13 Warning symbols and other signs on the machine

Always keep all the warning symbols on the machine clean and in a legible state. Replace illegible warning symbols. You can obtain the warning symbols from your dealer using the order number (e.g. MD 075).

Warning symbols - structure

Warning symbols indicate danger areas on the machine and warn against residual dangers. At these points, there are permanent or unexpected dangers.

A warning symbol consists of two fields:

Field 1

is a symbol describing the danger, surrounded by triangular safety symbol.

Field 2

is a symbol showing how to avoid the danger.

Warning symbols - explanation

The column **Order number and explanation** provides an explanation of the neighbouring warning symbol. The description of the warning symbols is always the same and specifies, in the following order:

1. A description of the danger.

   For example: risk of cutting

2. The consequence of non-compliance with the risk avoidance instructions.

   For example: causes serious injuries to fingers or hands.

3. Risk avoidance instructions.

   For example: only touch machine parts when they have come to a complete standstill.

2.13.1 Positions of warning symbols and other labels

Warning symbols

The following diagrams show the arrangement of the warning symbols on the machine.

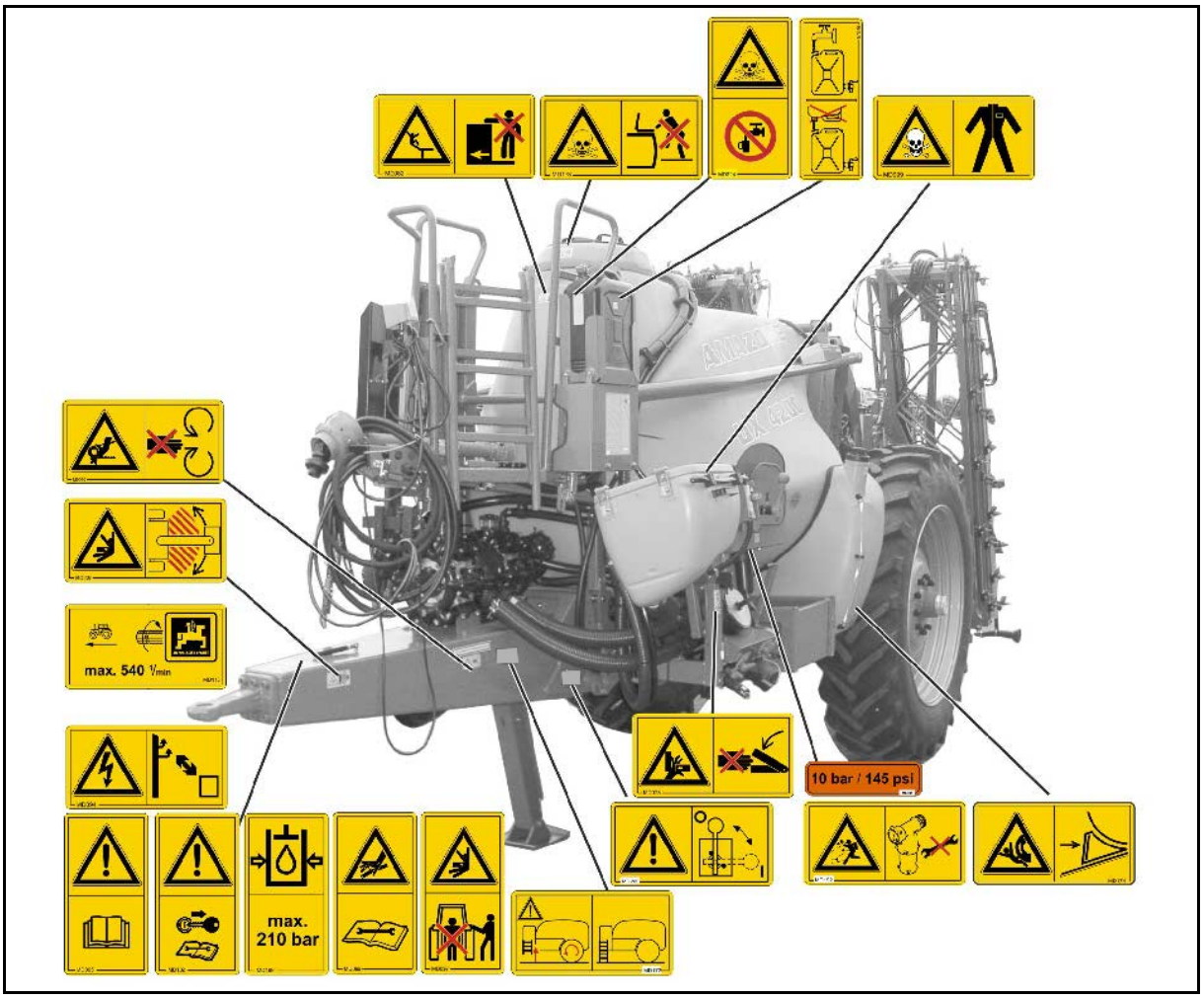


Fig. 1

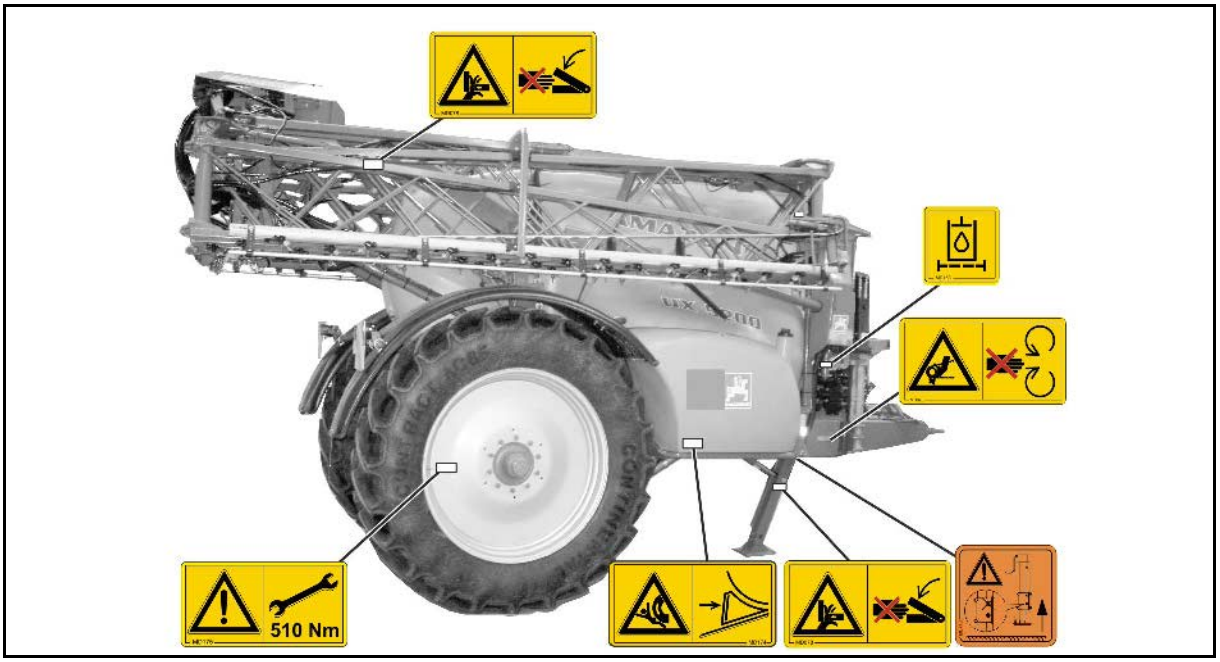


Fig. 2

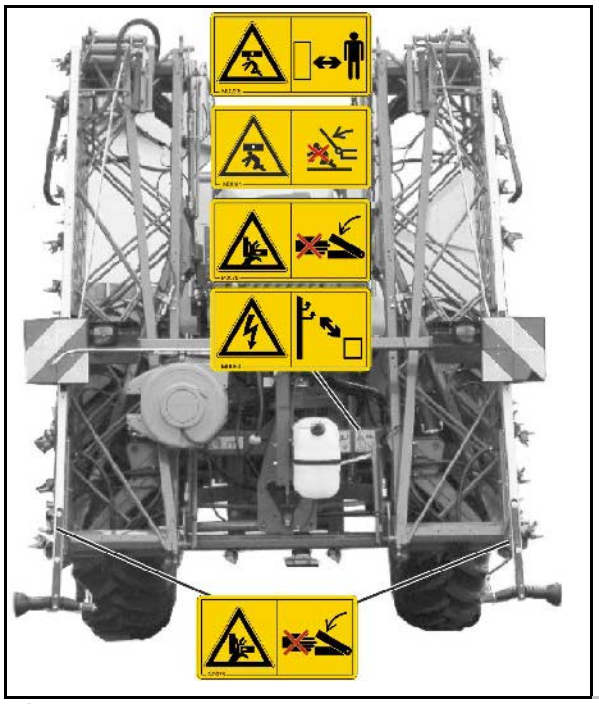


Fig. 3

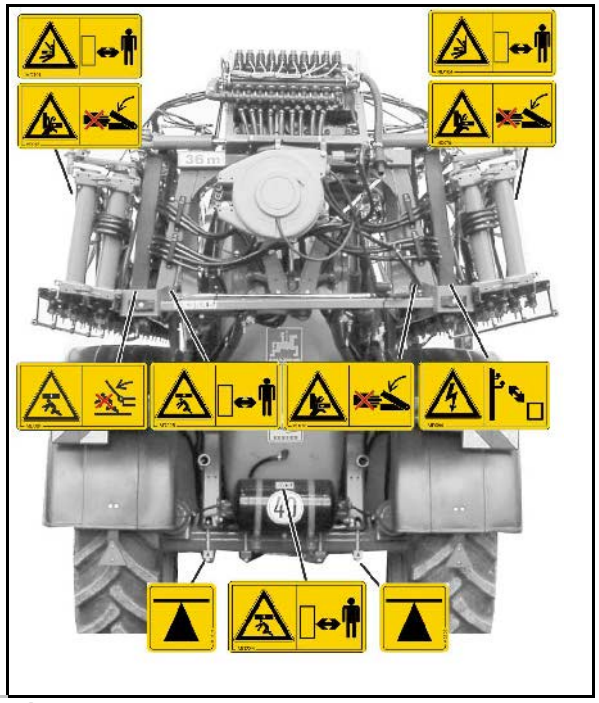
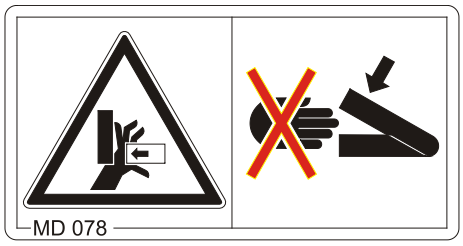


Fig. 4

Order number and explanation	Warning symbols
MD 076 **Danger of your hand or arm being drawn in or caught by power-driven, unprotected chain or belt drives.** This danger causes serious injuries, including loss of body parts such as the hand or arm. Never open or remove protective equipment from chains or belt drives, • while the tractor engine is running and the PTO shaft is connected / hydraulic drive is engaged • or the ground wheel drive is moving	
MD 078 **Risk of crushing fingers or hands by accessible moving machine parts.** This danger causes serious injuries, including loss of body parts such as fingers or hand. Never reach into the danger area while the tractor engine is running and the PTO shaft / hydraulic system is connected.	
MD 082 **Danger of falling from treads and platforms when riding on the machine.** This danger causes serious or potentially fatal injuries anywhere on the body. It is forbidden to ride on the machine and/or climb the machine while it is running. This also applies to machines with treads or platforms. Make sure that nobody is riding on the machine.	

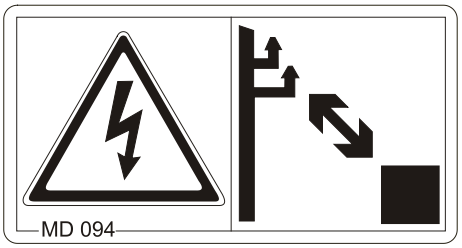
MD 084

Risk of crushing the entire body due to standing in the swivel range when machine parts are being lowered.

This danger can cause extremely serious and potentially fatal injuries.

- It is forbidden to stand in the swivel range of the machine when machine parts are being lowered.
- Instruct personnel to leave the swivel range of any machine parts which can be lowered before you lower the parts.

MD 094



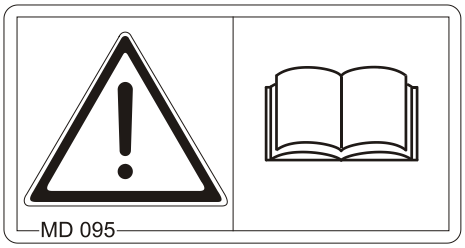
Risk of electric shock or burns from accidentally touching overhead power lines or by coming within the prohibited distance of high voltage overhead power lines**.**

This danger causes serious or potentially fatal injuries anywhere on the body.

Maintain a sufficient distance from electrical overhead cables when swinging any parts of the machine in and out.

Nominal voltage	Safety distance from transmission lines
up to 1 kV	1 m
over 1 up to 110 kV	2 m
over 110 up to 220 kV	3 m
over 220 up to 380 kV	4 m

MD 095



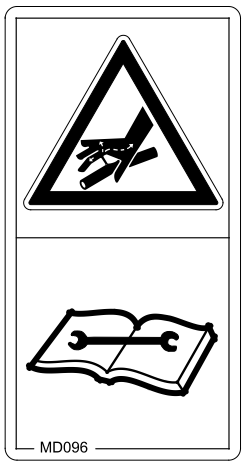
Read and follow the operating manual and safety information before starting up the machine!

MD 096

Danger from escaping high-pressure hydraulic fluid due to leaking hydraulic hose lines.

This danger may cause serious injuries, perhaps even resulting in death, if escaping high-pressure hydraulic fluid passes through the skin and into the body.

- Never attempt to plug leaks in hydraulic hose lines with your hand or fingers.
- Read and observe the information in the operating manual before carrying out maintenance work on the hydraulic hose lines.
- If you are injured by hydraulic fluid, contact a doctor immediately.

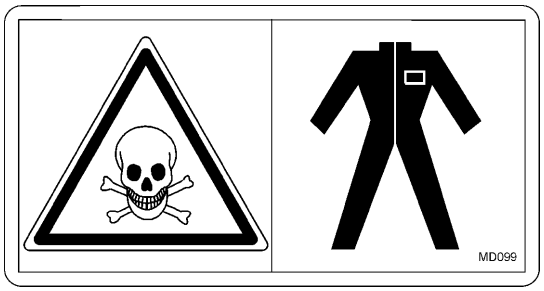


MD 099

Risk of contact with hazardous materials due to improper handling.

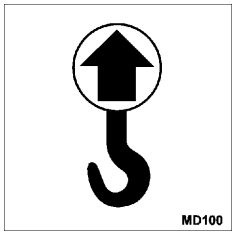
This danger can cause extremely serious and potentially fatal injuries.

Before coming into contact with hazardous materials, put on protective clothing. Follow the manufacturer's safety instructions for the materials to be processed



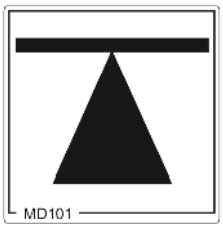
MD 100

This symbol indicates anchorage points for fastening slinging gear when loading the machine.



MD101

This symbol indicates jacking points for lifting gear (jack).

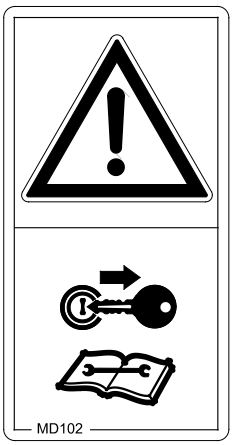


MD 102

Danger from intervention in the machine, e.g. installation, adjusting, troubleshooting, cleaning, maintaining and repairing, due to the tractor and the machine being started unintentionally and rolling.

These dangers can cause extremely serious and potentially fatal injuries.

- Secure the tractor and the machine against unintentional start-up and rolling before any intervention in the machine.
- Depending on the type of intervention, read and observe the instructions in the appropriate sections of the operating manual.

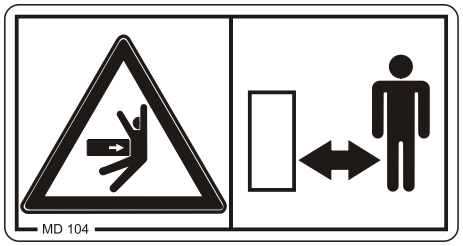


MD 104

Risk of crushing the entire body or impacts due to standing in the swivel range of laterally moving machine parts.

These dangers can cause extremely serious and potentially fatal injuries.

- Maintain an adequate safety distance from moving machine parts while the tractor engine is running.
- Please ensure that all personnel maintain a sufficient safety distance from moving machine parts**.**

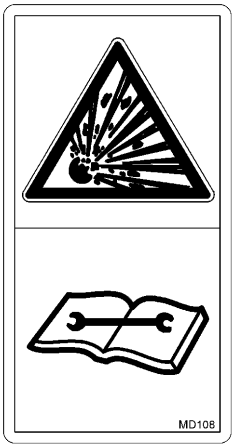


MD 108

Risk of explosion, or danger from hydraulic fluid escaping under high pressure, caused by the pressure accumulator which is under pressure from gas and oil.

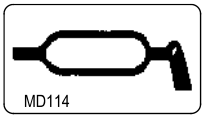
These dangers can cause serious and potentially fatal injuries if highly pressurised, escaping hydraulic fluid penetrates the skin and passes into the body.

- Read and observe the instructions in the operating manual before carrying out any maintenance or repair work.
- If you are injured by hydraulic fluid, contact a doctor immediately.



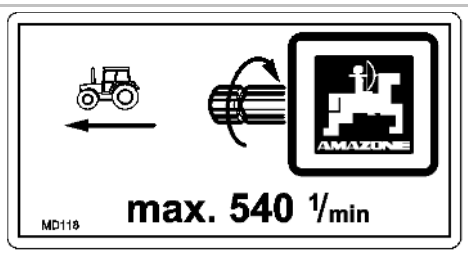
MD 114

This symbol indicates a lubrication point



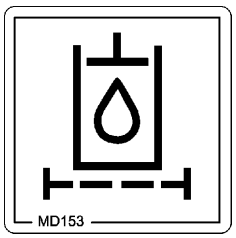
MD 118

This symbol indicates the maximum drive speed (540 rpm) and direction of rotation of the drive shaft on the machine side.



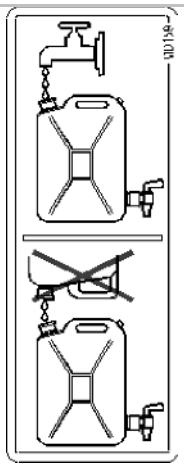
MD 153

This pictogram indicates a hydraulic oil filter.



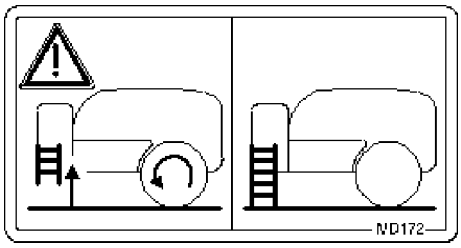
MD 159

Only fill the hand wash tank with clear fresh water, and never with crop protection agent.



MD 172

Swing the ladder to the operation platform upwards into transport position when driving!

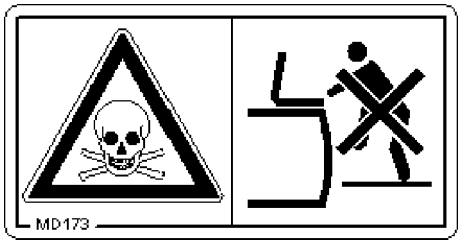


MD 173

Risk of breathing in hazardous materials via poisonous vapours from the spray liquid tank.

This danger can cause extremely serious and potentially fatal injuries.

Never climb into the spray liquid tank.

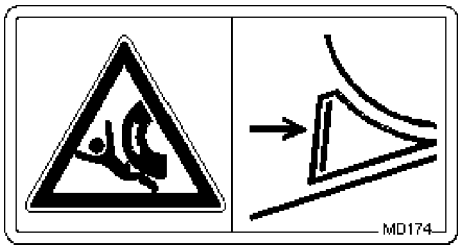


MD 174

Danger from unintended continued movement of the machine.

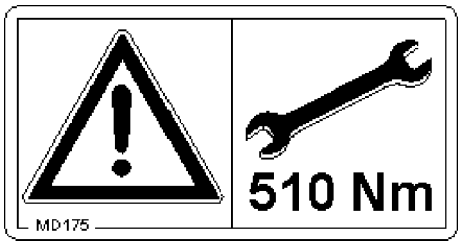
Causes serious, potentially fatal injuries anywhere on the body.

Secure the machine against unintended continued movement before uncoupling the machine from the tractor. To do this, use the parking brake and/or the wheel chock(s).



MD 175

The torque of the screw connection is 510 Nm.

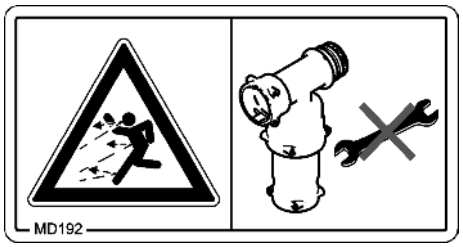


MD 192

Danger of fluids escaping under high pressure while working on hoses and connections under pressure!

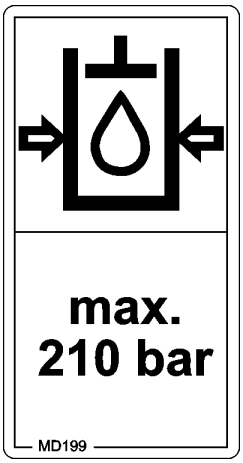
This can result in extremely serious injuries on all parts of the body.

It is not allowed to work on this component.



MD 199

The maximum operating pressure of the hydraulic system is 210 bars.

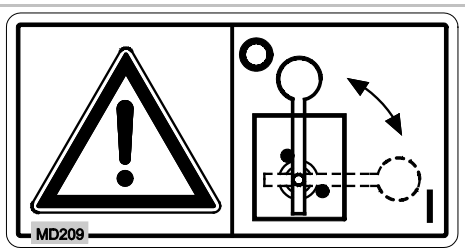


MD 209

Danger during transportation from unintended swivelling of the implement or from moving parts of the implement.

This hazard can result in extremely serious and potentially fatal injuries.

Close the stop tap for transporting.



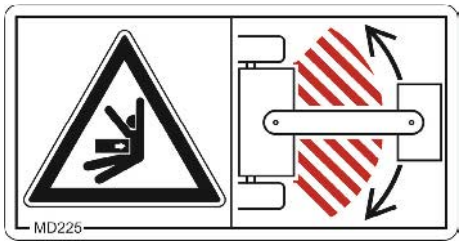
MD 224

Risk of contact with hazardous materials due to improper use of clear fresh water from the hand wash tank.

This danger can cause extremely serious and potentially fatal injuries.

Never use the clear fresh water from the hand wash tank as drinking water.

MD 225

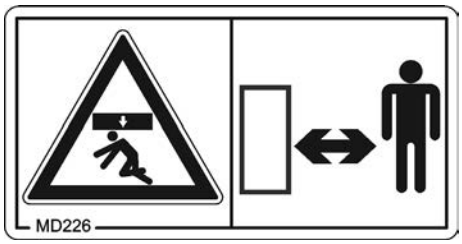


Danger of crushing the entire body, caused by remaining in the swivel range of the draw-bar between tractor and attached machine.

This danger can cause extremely serious and potentially fatal injuries.

- Do not remain in the danger area between tractor and machine while the tractor engine is running and the tractor is not secured against unintentional rolling.
- Instruct anyone in the danger area between tractor and machine to leave the danger area while the tractor engine is running and the tractor is not secured against unintentional rolling.

MD 226



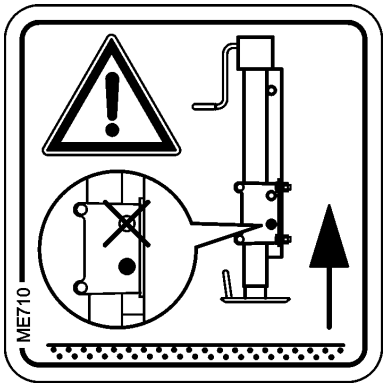
Risk of crushing the entire body due to standing under suspended loads or raised machine parts.

This danger can cause extremely serious and potentially fatal injuries.

- It is forbidden to stand under suspended loads or raised machine parts.
- Maintain an adequate safety distance from any suspended loads or raised machine parts.
- Ensure that all personnel maintain an adequate safety distance from suspended loads or raised machine parts.

ME 710

In transport position, unplug the lower hole on the mechanical stand.



ME 985

The system pressure is 10 bar.

2.14 Potential risks from not observing the safety instructions

Non-compliance with the safety information

- can pose both a danger to people and also to the environment and machine.
- can lead to the loss of all warranty claims.

In particular, non-compliance with the safety information could pose the following risks:

- Danger to people through non-secured working areas.
- Failure of important machine functions.
- Failure of prescribed methods of maintenance and repair.
- Danger to people through mechanical and chemical influences.
- Risk to the environment through leakage of hydraulic fluid.

2.15 Safety-conscious working

Besides the safety information in this operating manual, the generally applicable national workplace safety and accident prevention regulations are binding.

Comply with the accident prevention instructions on the warning symbols.

When driving on public roads and routes, comply with the appropriate statutory road traffic regulations.

2.16 Safety information for users

WARNING

Risk of crushing, cutting, being trapped or drawn in, or impact through inadequate roadworthiness and operational safety.

Before starting up the machine and the tractor, always check their roadworthiness and operational safety.

2.16.1 General safety and accident prevention information

- Beside these instructions, comply with the generally applicable national safety and accident prevention regulations.
- The warning symbols and other labels attached to the machine provide important information on safe machine operation. Compliance with this information is in the interests of your safety.
- Before moving off and starting up the machine, check the immediate area of the machine (children). Ensure that you can see clearly.
- It is forbidden to ride on the machine or use it as a means of transport.
- Drive in such a way that you always have full control over the tractor with the attached machine.

  In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the connected machine.

Coupling and uncoupling the machine

- Only connect and transport the machine with tractors suitable for the task.
- When coupling machines to the tractor's three-point linkage, the linkages of the tractor and the machine must always be the same.
- Connect the machine to the prescribed equipment in accordance with the specifications.
- When coupling machines to the front or the rear of the tractor, the following may not be exceeded:
  - The approved total tractor weight
  - The approved tractor axle loads
  - The approved load capacities of the tractor tyres
- Secure the tractor and the machine against rolling unintentionally before coupling or uncoupling the machine.
- Do not stand between the machine and tractor to be coupled while the tractor is approaching the machine.

  Any helpers may only act as guides standing next to the vehicles, and may only move between the vehicles when both are at a standstill.
- Before connecting the machine to or disconnecting the machine from the tractor's three-point linkage, secure the operating lever of the tractor hydraulic system so that unintentional raising or lowering is prevented.

- When coupling and uncoupling machines, move the support equipment (if available) to the appropriate position (stability).
- When actuating the support equipment, there is a risk of injury from crushing and cutting points.
- Be particularly careful when coupling the machine to the tractor or uncoupling it from the tractor. There are crushing and cutting points in the area of the coupling point between the tractor and the machine.
- It is forbidden to stand between the tractor and the machine when actuating the three-point linkage.
- Coupled supply lines
  - must give slightly to all movements while cornering without tensioning, kinking or rubbing.
  - must not chafe against other parts.
- The release ropes for quick couplings must hang loosely and must not release themselves when lowered.
- Also ensure that uncoupled machines are stable.

Use of the machine

- Before starting work, ensure that you understand all the equipment and actuation elements of the machine and their function. There is no time for this when the machine is already in operation.
- Do not wear loose-fitting clothing. Loose clothing increases the risk of being caught by the drive shaft.
- Only start-up the machine, when all the safety equipment has been attached and is in the safety position.
- Comply with the maximum load for the connected machine and the permissible axle and drawbar loads for the tractor. If necessary, drive only with a partially filled tank.
- It is forbidden to stand in the working area of the machine.
- It is forbidden to stand in the turning and swivel range of the machine.
- There are crushing and cutting points at externally-actuated (e.g. hydraulic) machine points.
- Only actuate externally-actuated machine parts when you are sure that no-one is standing within the prescribed safety distance.
- Before leaving the tractor, secure it against unintended starting and rolling.

  To do this:
  - lower the machine onto the ground
  - apply the parking brake
  - switch off the tractor engine
  - remove the ignition key

Machine transportation

- When using public highways, national road traffic regulations must be observed.
- Before moving off, check:
  - the correct connection of the supply lines
  - the lighting system for damage, function and cleanliness
  - the brake and hydraulic system for visible damage
  - that the parking brake is completely disengaged
  - the function of the brake system
- Ensure that the tractor has sufficient steering and braking power.

  Any machines and front/rear weights connected to the tractor influence the driving behaviour and the steering and braking power of the tractor.
- If necessary, use front weights.

  The front tractor axle must always be loaded with at least 20% of the tractor empty weight, in order to ensure sufficient steering power.
- Always fix the front or rear weights to the intended fixing points according to regulations.
- Comply with the maximum load for the connected machine and the approved axle and drawbar loads for the tractor.
- The tractor must guarantee the prescribed brake delay for the loaded vehicle combination (tractor plus connected machine).
- Check the brake power before moving off.
- When turning corners with the machine connected, take the broad load and balance weight of the machine into account.
- If the machine is fixed to the tractor's three-point linkage or lower links, before moving off, ensure sufficient side locking of the tractor lower links.
- Before moving off, move all the swivellable machine parts to the transport position.
- Before moving off, secure all swivellable machine parts in the transport position against dangerous position changes. Use the transport safety catches intended for this.
- Before transportation, secure the operating lever of the three-point hydraulic system against unintentional raising or lowering of the connected or coupled machine.
- Check that the transport equipment, e.g. lighting, warning equipment and protective equipment, is correctly mounted on the machine.
- Before transportation, carry out a visual check that the upper and lower link pins are firmly fixed with the linchpin against unintentional release.
- Adjust your driving speed to the prevailing conditions.
- Before driving downhill, switch to a low gear.
- Before moving off, always switch off independent wheel braking (lock the pedals).

2.16.2 Hydraulic system

- The hydraulic system is under a high pressure.
- Ensure that the hydraulic hose lines are connected correctly.
- When connecting the hydraulic hose lines, ensure that the hydraulic system is depressurised on both the machine and tractor sides.
- It is forbidden to lock the operator controls on the tractor used for hydraulic and electrical movements of components, e.g. folding, swivelling and pushing movements. The movement must stop automatically when you release the appropriate control. This does not apply to equipment movements that:
  - are continuous
  - are automatically controlled
  - require a floating position or pressed position to function
- Before working on the hydraulic system,
  - lower the machine
  - depressurise the hydraulic system
  - shut off the tractor engine
  - apply the parking brake
  - remove the ignition key
- Have the hydraulic hose lines checked at least once a year by a specialist for proper functioning.
- Replace the hydraulic hose lines if they are damaged or worn. Only use original AMAZONE hydraulic hose lines.
- The hydraulic hose lines should not be used for longer than six years. This period includes any storage time of a maximum of two years. Even with proper storage and approved use, hoses and hose connections are subject to natural ageing, thus limiting the length of use. However, it may be possible to specify the length of use from experience values, in particular when taking the risk potential into account. In the case of hoses and hose connections made from thermoplastics, other guide values may be decisive.
- Never attempt to plug leaks in hydraulic hose lines with the hand or fingers.

  Escaping high pressure fluid (hydraulic fluid) may pass through the skin and ingress into the body, causing serious injuries.

  If you are injured by hydraulic fluid, contact a doctor immediately. Danger of infection.
- When searching for leakage points, use suitable aids, to avoid the serious risk of infection.

2.16.3 Electrical system

- When working on the electrical system, always disconnect the battery (negative terminal).
- Only use the prescribed fuses. If fuses are used that are too highly rated, the electrical system will be destroyed – risk of fire.
- Ensure that the battery is connected correctly - firstly connect the positive terminal and then connect the negative terminal. When disconnecting the battery, disconnect the negative terminal first, followed by the positive terminal.
- Always place the appropriate cover over the positive battery terminal. If there is accidental earth contact, there is a risk of explosion.
- Risk of explosion. Avoid sparking and naked flames in the area of the battery.
- The machine may be equipped with electronic components whose function is influenced by electromagnetic interference from other units. Such interference can pose risks to people, if the following safety information is not followed.
  - If retrofitting electrical units and/or components on the machine with a connection to the on-board power supply, the user is responsible for checking whether the installation might cause faults on the vehicle electronics or other components.
  - Ensure that the retrofitted electrical and electronic components comply with the EMC directive 2004/108/EC in the appropriate version and bear the CE mark.

2.16.4 Universal joint shaft operation

- Use only the PTO shafts prescribed by the AMAZONEN-WERKE factories, equipped with the proper safety devices.
- Also read and follow the operating manual from the PTO shaft manufacturer.
- The protective tube and PTO shaft guard must be undamaged, and the shield of the tractor and machine universal joint shaft must be attached and be in proper working condition.
- Work is prohibited while the safety devices are damaged.
- You may install or remove the PTO shaft only after you have done all of the following:
  - Switched off the universal joint shaft
  - Switched off the tractor engine
  - Applied the parking brake
  - the ignition key has been removed
- Always ensure that the PTO shaft is installed and secured correctly.
- When using wide-angle PTO shafts, always install the wide angle joint at the pivot point between the tractor and machine.
- Secure the PTO shaft guard by attaching the chain(s) to prevent movement.
- Observe the prescribed pipe overlaps in transport and operational positions. (Read and follow the operating manual from the PTO shaft manufacturer.)
- When turning corners, observe the permitted bending and displacement of the PTO shaft.
- Before switching on the universal joint shaft, check that the selected universal joint shaft speed of the tractor matches the permitted drive speed of the machine.
- Instruct people to leave the danger area of the machine before you switch on the universal joint shaft.
- While work is being carried out with the universal joint shaft, there must be no one in the area of the universal joint or PTO shaft while it is turning.
- Never switch on the universal joint shaft while the tractor engine is shut off.
- Always switch off the universal joint shaft whenever excessive bending occurs or it is not needed.
- WARNING! After the universal joint shaft is switched off, there is a danger of injury from the continued rotation of freewheeling machine parts.

  Do not approach the machine too closely during this time. You may work on the machine only after all machine parts have come to a complete stop.
- Secure the tractor and machine against unintentional starting and unintentional rolling before you perform any cleaning, servicing or maintenance work on universal joint shaft-driven machines or PTO shafts.
- After decoupling the PTO shaft, place it on the holder provided.

- After removing the PTO shaft, attach the protective sleeve to the universal joint shaft stub.
- When using the travel-dependent universal joint shaft, note that the universal joint shaft speed depends on the drive speed, and that the direction of rotation reverses when you drive in reverse.

2.16.5 Coupled machines

- Observe the permitted combination options of the attachment equipment on the tractor and the machine drawbar.

  Only couple permitted combinations of vehicles (tractor and attached machine).
- On single axle machines, observe the maximum permitted drawbar load of the tractor on the attachment equipment.
- Ensure that the tractor has sufficient steering and braking power.

  Machines attached or coupled to a tractor influence the driving behaviour and steering and braking power of the tractor, and in particular single axle machines with drawbar loads on the tractor.
- Only one specialist workshop can adjust the height of the drawbar if it is a straight drawbar with drawbar load.

2.16.6 Brake system

- Only specialist workshops or recognised brake services can carry out adjustment and repair work on the brake system.
- Have the brake system thoroughly checked regularly.
- If there are any malfunctions, stop the tractor immediately using the brake system. Have the malfunction rectified immediately.
- Before performing any work on the braking system, park the machine safely and secure the machine against unintentional lowering or rolling away (wheel chocks).
- Be particularly careful when carrying out any welding, torch cutting or drilling work in the area of the brake lines.
- Always carry out a braking test after any adjusting or repair work on the braking system.

Pneumatic braking system

- Before coupling the machine, clean the sealing rings on the hose couplings of the supply and brake line.
- Only move off with the machine connected when the pressure gauge on the tractor shows 5.0 bar.
- Drain the air reservoir every day.
- Before driving without the machine, lock the hose couplings on the tractor.
- Hang the hose couplings of the machine supply and brake lines in the appropriate empty couplings.
- When filling up or replacing the brake fluid, use the prescribed fluid. When replacing the brake fluid, comply with the appropriate regulations.
- Do not make any changes to the specified settings on the brake valves.
- Replace the air reservoir if:
  - the air reservoir can be moved in the tensioning belts
  - the air reservoir is damaged
  - the rating plate on the air reservoir is rusty, loose or missing.

Hydraulic brake system for export machines

- Hydraulic brake systems are prohibited in Germany.
- When filling up or replacing the brake fluid, use the prescribed hydraulic fluids. When replacing the hydraulic fluids, comply with the appropriate regulations.

2.16.7 Tyres

- Repair work on tyres and wheels may only be carried out by specialists with suitable installation tools.
- Check the air pressure at regular intervals.
- Inflate tyres to the specified pressure. If the air pressure in the tyres is too high, then there is a risk of explosions.
- Park the machine in a safe place and lock the machine against unintentional lowering and rolling (parking brake, wheel chocks), before carrying out work on the tyres.
- Tighten or retighten all the fixing screws and nuts in accordance with the specifications of AMAZONEN-WERKE.

2.16.8 Field sprayer operation

- Observe the recommendations of the crop protection agent manufacturer in respect of
  - protective clothing
  - warning information on exposure to crop protection agents
  - regulations on dosing, applications and cleaning
- Observe the information in the German Plant Protection Law.
- Never open lines which are under pressure.
- Only use genuine AMAZONE replacement hoses which stand up to chemical, mechanical and thermal requirements. Only use hose clamps made from V2A for installation.
- The nominal volume of the spray liquid tank must not be exceeded during filling.

- When there will be exposure to crop protection agent, wear the proper protective clothing, i.e. gloves, overalls, safety glasses, etc.
- When using tractors with a cab with ventilation fans, replace the fresh air filters with activated carbon filters.
- Observe the information on the compatibility of crop protection agents and substances for the field sprayer.
- Do not spray any crop protection agents which have a tendency to stick together or set.
- Do not fill field sprayers with water from bodies of water which are open to the public, for the protection of people, animals and the environment.
- Only fill field sprayers
  - using a free flow from the mains water supply.
  - using genuine AMAZONE filling equipment.

2.16.9 Cleaning, maintenance and repairs

- Due to toxic vapours in the spray liquid tank, climbing into the spray liquid tank is always forbidden.
- Repair work in the spray liquid tank must only be carried out by a specialist workshop!
- As a general rule, only carry out maintenance or repair work or cleaning when
  - the drive is switched off
  - the tractor engine has come to a complete stop
  - the ignition key has been removed
  - the machine connector has been removed from the on-board computer
- Regularly check the nuts and bolts for firm seating and retighten them as necessary.
- Secure the raised machine and/or raised machine parts against unintentional lowering before performing any cleaning, maintenance or repair work on the machine.
- When replacing work tools with blades, use suitable tools and gloves.
- Dispose of oils, greases and filters in the appropriate way.
- Disconnect the cable to the tractor generator and battery before carrying out electrical welding work on the tractor and on attached machines.
- Spare parts must meet at least the specified technical requirements of AMAZONEN-WERKE.
  This is ensured through the use of genuine AMAZONE spare parts.
- When repairing field sprayers which have been used for liquid fertiliser application with ammonium nitrate / urea solution, observe the following points:

  Residues of ammonium nitrate / urea solutions may form salts by the evaporation of the water on or in the spray liquid tank. This produces pure ammonium nitrate and urea. In its undiluted form, ammonium nitrate is explosive when combined with organic substances, e.g. urea, and subjected to critical temperatures during repair work (e.g. welding, grinding, filing).

  This danger can be eliminated by thoroughly washing out the spray liquid tank or the parts intended for repair with water, because the salt of the ammonium nitrate / urea solution is water-soluble. For this reason, clean the field sprayer thoroughly with water before carrying out repair work.

3 Loading and unloading

Loading and unloading with a tractor

WARNING

There is a risk of accident if the tractor is unsuitable and the machine brake system is not connected to the tractor or filled.

- Couple the machine to the tractor correctly before loading the machine onto a transport vehicle or unloading it from a transport vehicle.
- You may only couple and transport the machine with a tractor for loading and unloading, if the tractor meets the necessary power requirements.

Pneumatic braking system:

- Only move off with the machine connected when the pressure gauge on the tractor shows 5.0 bar.

Loading using a lifting crane

There are 4 attachment points (Fig. 5/1) on the right and 4 on the left of the machine.

DANGER

Danger! Machine can drop down!

Empty the tank before lifting the machine.
Lift the machine only at the points indicated.

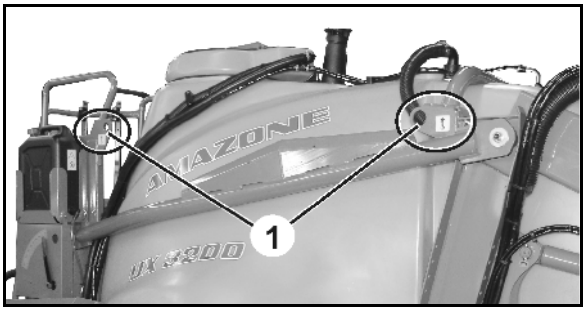


Fig. 5

DANGER

The minimum tensile strength for each lifting belt must be 2000 kg.

Transport locks for hydraulic stand

Remove the transport locks for the stand after unloading the machine.

1. Hydraulically raise the machine over the stand.
2. Remove the transport locks

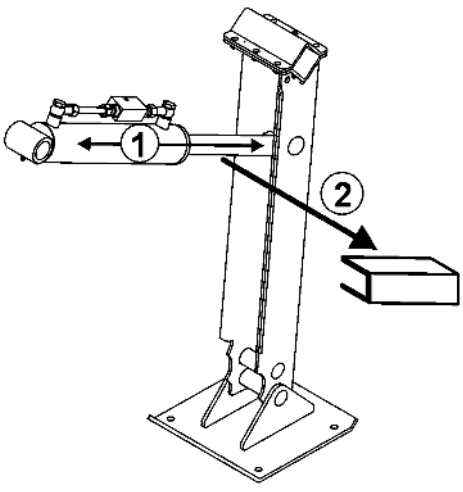


Fig. 6

4 Product description

This section:

- provides a comprehensive overview of the machine structure.
- provides the names of the individual modules and controls.

If possible, read this section when actually at the machine. This helps you to understand the machine better.

4.1 Overview of the assemblies

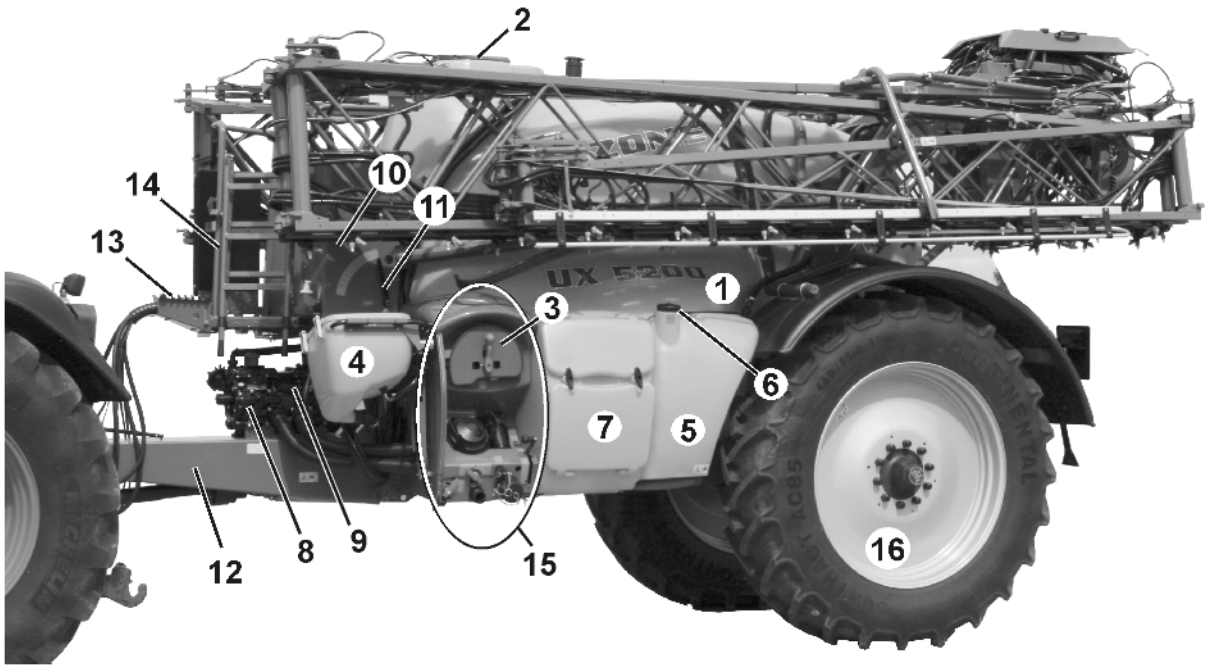


Fig. 7

(1) Spray liquid tank
(2) Filling opening for spray liquid tank
(3) Pressure gauge
(4) Swivel-out induction bowl (in filling position)
(5) Flushing water tank 1
(6) Flushing water tank 1, filling opening
(7) Transport/safety box
(8) Spraying pump
(9) Agitator pump
(10) Fresh water tank Maintenance platform
(11) Fill level indicator
(12) Drawbar
(13) Hose cabinet
(14) Swivel-down ladder
(15) Control terminal
(16) Wheels and tyres

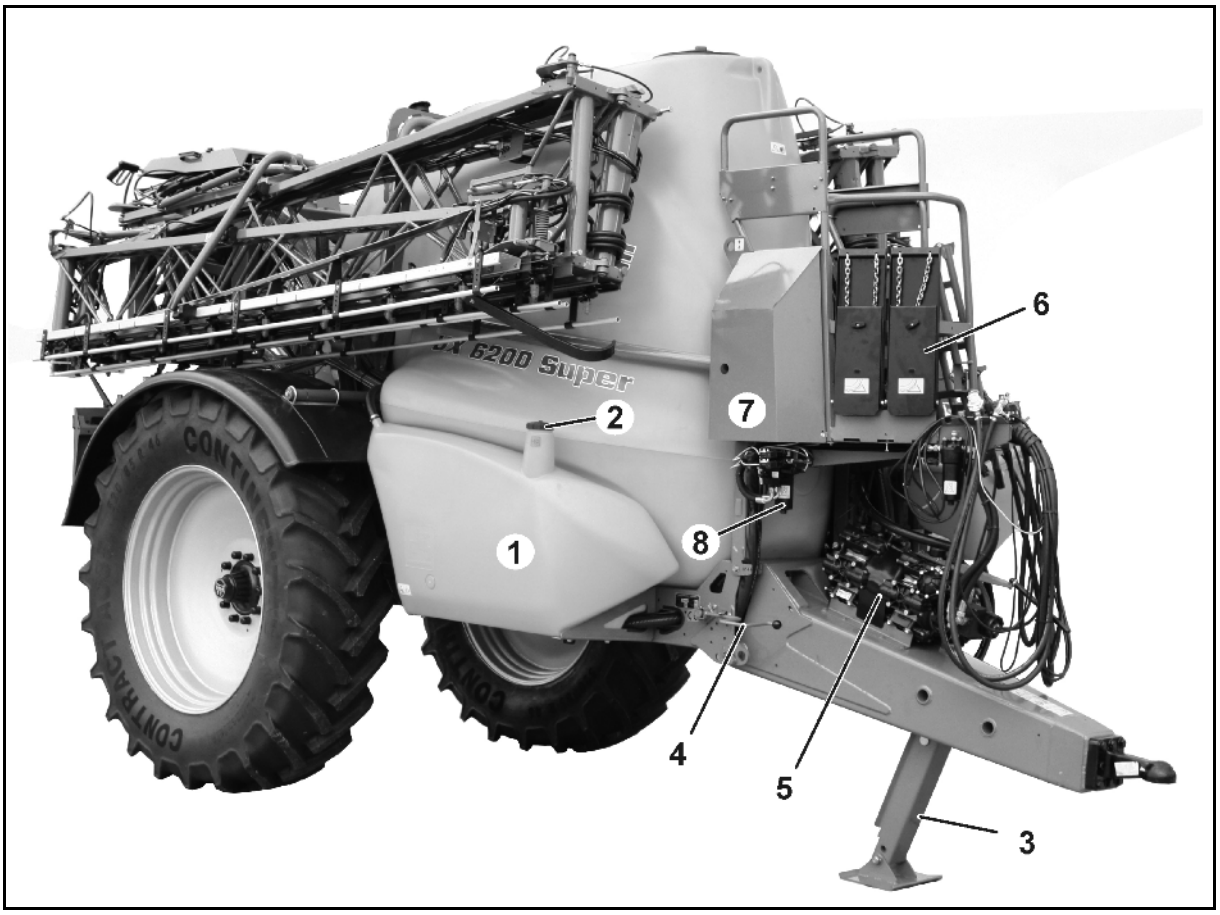


Fig. 8

(1) Flushing water tank 2

(2) Flushing water tank 2, filling opening

(3) Hydraulic stand

(4) Parking brake

(5) Pump equipment

(6) Wheel chocks

(7) Hydraulic block with system setting screw, job computer

(8) Oil filter with clogging indicator

4.2 Safety and protection equipment

- Transport locking mechanism (Fig. 9/1) to prevent the **Super-L** boom from folding out unintentionally

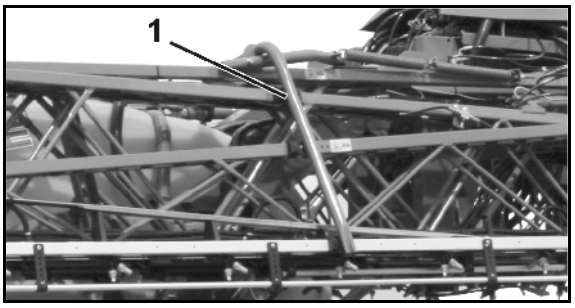


Fig. 9

- Transport locking mechanism (Fig. 10) to prevent the **Super-S** boom from folding out unintentionally

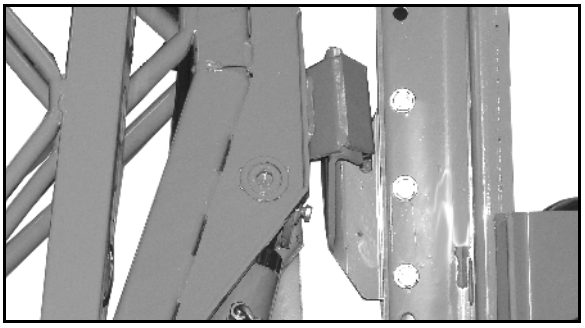


Fig. 10

- Fig. 11:

Handrail on the Maintenance platform

Fig. 11

- Fig. 12/…

(1) PTO shaft guard with supporting chains

(2) Machine PTO shaft guard

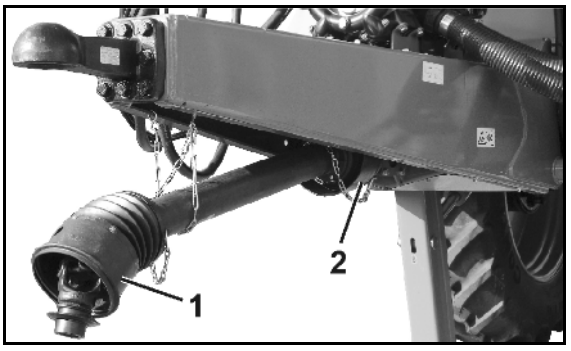


Fig. 12

- Fig. 13:

Stop tap on AutoTrail drawbar against unintentional activation of the track follow steering

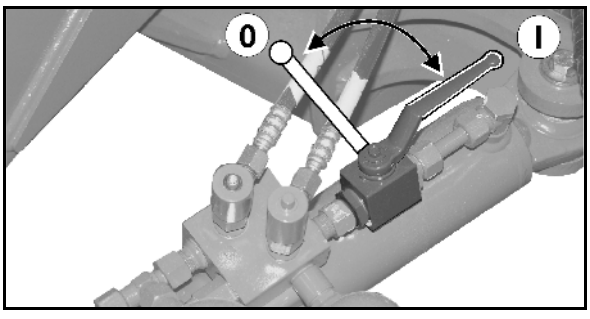


Fig. 13

4.3 Liquid circuit

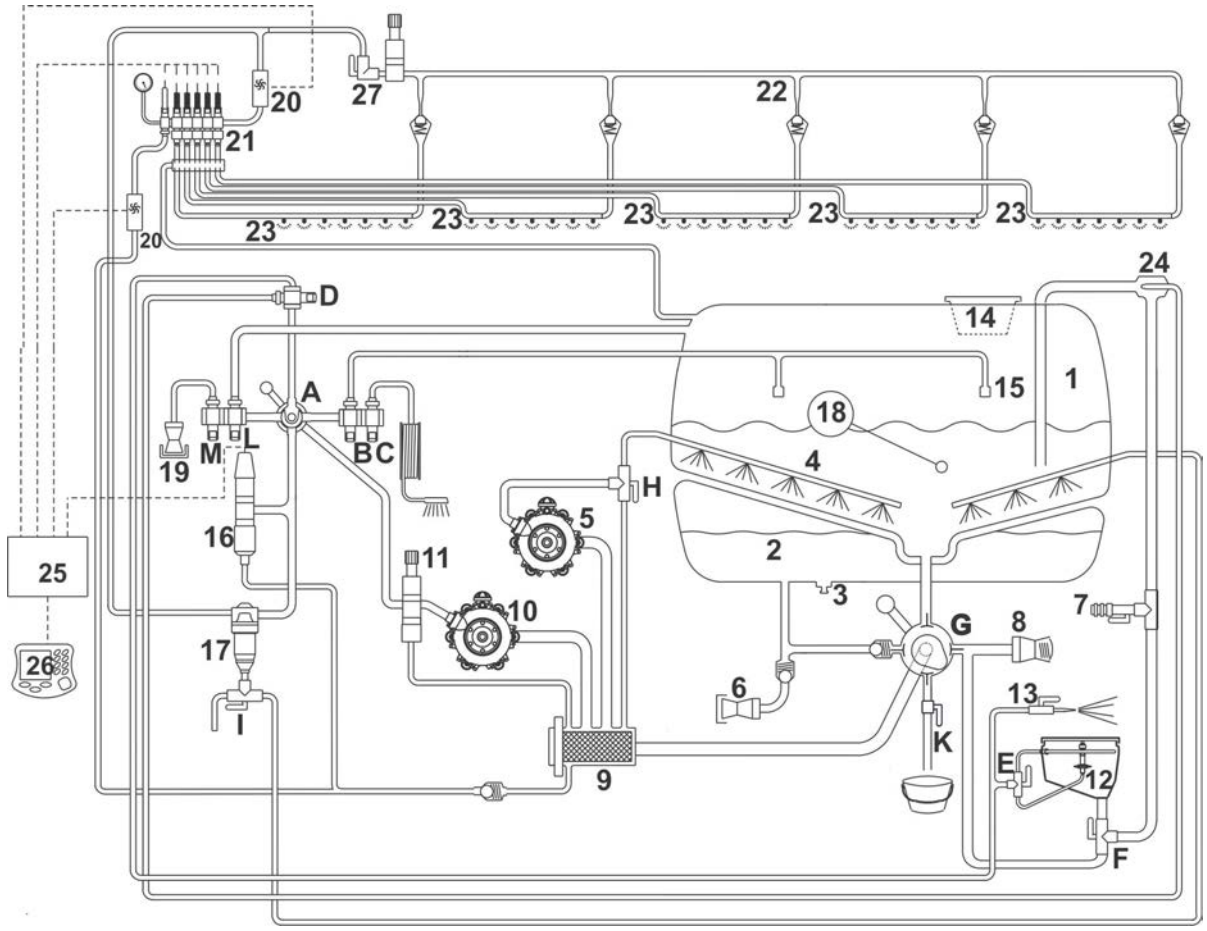


Fig. 14

1. Spray liquid tank
2. Flushing water tank
3. Flushing water drain plug
4. Agitator
5. Agitator pump
6. Flushing water filling coupling
7. Coupling for Ecofill
8. Suction hose quick coupling
9. Suction filter
10. Spraying pump
11. Spraying pump safety valve
12. Induction device
13. Induction device cleaning hose
14. Filling sieve
15. Inner pre-cleaning nozzles
16. Pressure control valve
17. Pressure filter
18. Fill level gauge
19. Quick emptying via pump
20. Flow rate sensor
21. Part width section valve
22. DUS - pressure circulating system
23. Spray lines
24. Injector
25. Machine computer
26. Control terminal
27. DUS switch tap

(A) Pressure equipment 4-way switch tap
(B) Internal cleaning switch tap
(C) External cleaning switch tap
(D) Injector switch tap
(E) Ring line / canister cleaning switch tap
(F) Evacuate induction bowl / Ecofill switch tap
(G) Suction chest manual operation
(H) Main agitator setting tap
(K) Draining switch tap
(L) Filling switch tap
(M) Quick emptying switch tap

4.4 Supply hoses between the tractor and the machine

Supply hoses in parking position:

Fig. 15/...

(1) Hydraulic hose lines (depending on equipment)

(2) Electric cable for lighting

(3) Machine cable with machine connector for control terminal

(4) Brake line with coupling head for air brake

(not shown)
Brake line with connection to hydraulic brake

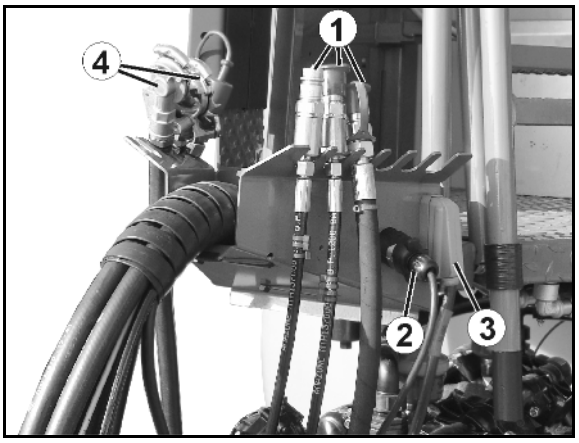


Fig. 15

4.5 Transportation equipment

Fig. 16:

(1) Rear lights, brake lights, turn indicators

(2) 2 warning signs (square)

(3) 2 red reflectors (triangular)

(4) 1 registration plate holder with lighting

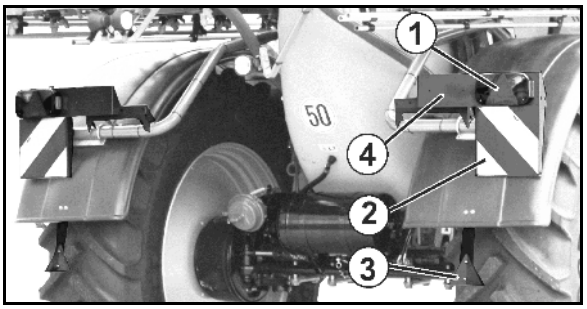


Fig. 16

Fig. 17:

(1) 2 x 3 reflectors, yellow
(lateral view: distance of max. 3m)

Fig. 17

Fig. 18/…

(1) Super-L boom
Additional brake light and position light
(not for France)

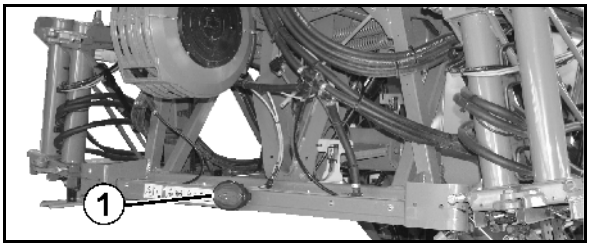


Fig. 18

Connect the lighting system via the connector to the 7-pin tractor socket.

For France, additional lateral danger signs and warning beacon on the sprayer boom are required.

4.6 Intended use

The field sprayer

- is intended for the transportation and application of crop protection agents (insecticides, fungicides, herbicides, etc.) in the form of suspensions, emulsions and mixtures, as well as of liquid fertilisers.
- uses state-of-the-art technology to ensure organic success, provided that all the correct adjustments are made and correct doses applied. Economical use of spraying agents and low rates of pollution are achieved.
- is intended exclusively for agricultural use, for treating field crops

Sloping terrain can be traversed as follows:

- **Along the contours**

  Direction of travel to left 15 %

  Direction of travel to right 15 %

- **Along the gradient**

  Up the slope 15 %

  Down the slope 15 %

Using the steering drawbar with AutoTrail control for precise tracking is prohibited if on sloping terrain. See page 72.

"Intended use" also covers:

- Compliance with all the instructions in this operating manual.
- Execution of inspection and maintenance work.
- Exclusive use of genuine **AMAZONE** spare parts.

Other uses to those specified above are forbidden and shall be considered as improper.

For any damage resulting from improper use:

- the operator bears the sole responsibility,
- AMAZONEN-WERKE accepts no liability.

4.7 Device inspections

The implement underlies the European Union universally applicable regular device inspections (Crop Protection Directive 2009/128/EC and EN ISO 16122).

Have the device inspected at regular intervals by a recognised and certified inspection workshop.

The date for performing the next device inspection is written on the inspection plate on the implement.

Fig. 19: German inspection plate

Fig. 19

4.8 Consequences of using certain crop protection agents

We would like to draw attention to the fact that extended exposure (20 hours) to crop protection agents with which we are familiar, e.g. Lasso, Betanal and Tramat, Stomp, Iloxan, Mudecan, Elancolan and Teridox, can cause damage to the pump diaphragms, hoses, spray lines and tanks. The examples given are in no way intended to represent a comprehensive list.

In particular, we warn against unauthorised mixtures of two or more different crop protection agents.

Substances which have a tendency to stick together or set must not be applied.

When using such aggressive crop protection agents, it is recommended that the spray liquid be applied immediately after preparation and then that the sprayer be thoroughly cleaned with water.

Viton membranes are available as replacements for pumps. These are resistant to solvent-containing crop protection agents. However their service life is reduced by use at low temperatures (e.g. AUS in frosty conditions).

The materials and components used for AMAZONE field sprayers are safe for liquid fertiliser.

4.9 Danger areas and danger points

The danger area is the area around the machine in which people can be caught by:

- work movements made by the machine and its tools
- materials or foreign bodies thrown out of the machine
- tools rising or falling unintentionally
- unintentional rolling of the tractor and the machine

Within the machine danger area, there are danger points with permanent or unexpected risks. Warning symbols indicate these danger points and warn against residual dangers, which cannot be eliminated for practical reasons. In such cases, the special safety regulations in the appropriate section are valid.

No-one may stand in the machine danger area:

- if the tractor engine is running with the PTO shaft / hydraulic system connected.
- if the tractor and machine are not protected against unintentional start-up and rolling.

The operating person may only move the machine or switch or drive the tools from the transport position to the working position or vice-versa when there is no-one in the machine danger area.

Danger points exist:

- between the tractor and field sprayer, particularly when coupling and uncoupling.
- where there are moving components.
- on the moving machine.
- in the swivel range of the sprayer boom.
- in the spray liquid tank due to poisonous vapours.
- under raised, unsecured machines or machine parts.
- when unfolding/folding the sprayer boom in the vicinity of overhead electricity cables, through contact with the cables.

4.10 Rating plate and CE mark

The rating plate shows:

- Vehicle- / machine ID no.:
- Type
- Basic weight kg
- Permissible support load kg
- Permissible rear axle load kg
- Permissible system pressure bar
- Permissible total weight kg
- Factory
- Model year
- Year of manufacture

Fig. 20

4.11 Conformity

	Directives/Standards designation	
The implement complies with the	• Implement directive	2006/42/EC
	• EMC directive	2004/108/EC

4.12 Maximum permissible application rate

The permissible application rate of the implement is limited by:

- the legally required agitator capacity.

  The permissible application rate is of particular importance for materials that require a high agitating intensity.

- the technical maximum application rate of 200 l/min (without HighFlow).

Determining the permissible application rate depending on the agitator capacity

Calculation formula for the application rate in l/min:

(The agitator capacity per minute must be 5% of the hopper volume)

Permissible application rate [l/min]	=	Pump capacity [l/min] (See page 93)	- 0.05 x nominal tank volume [l] (See page 51)

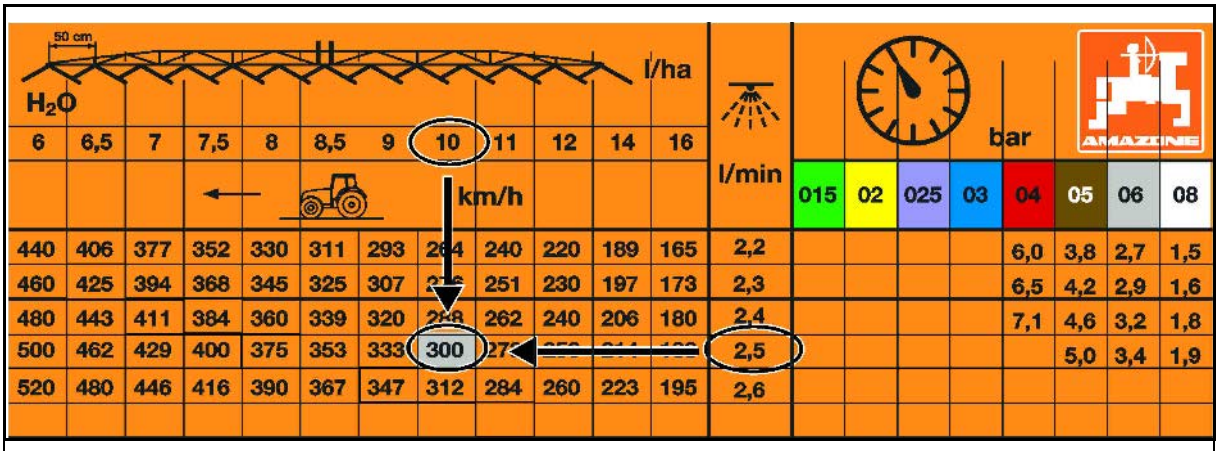
Conversion of the application rate in l/ha:

1. Determine the application rate per nozzle (divide the permissible application rate by the number of nozzles).
2. Read the application rate per hectare depending on the speed from the spray table (See page 231).

Example: UX 6200, pump 2x AR 280, Super L 36 m, 72 nozzles, 10 km/h

Permissible application rate = 2 x 245 l/min - 0.05 x 6,200 litres = 180 l/min

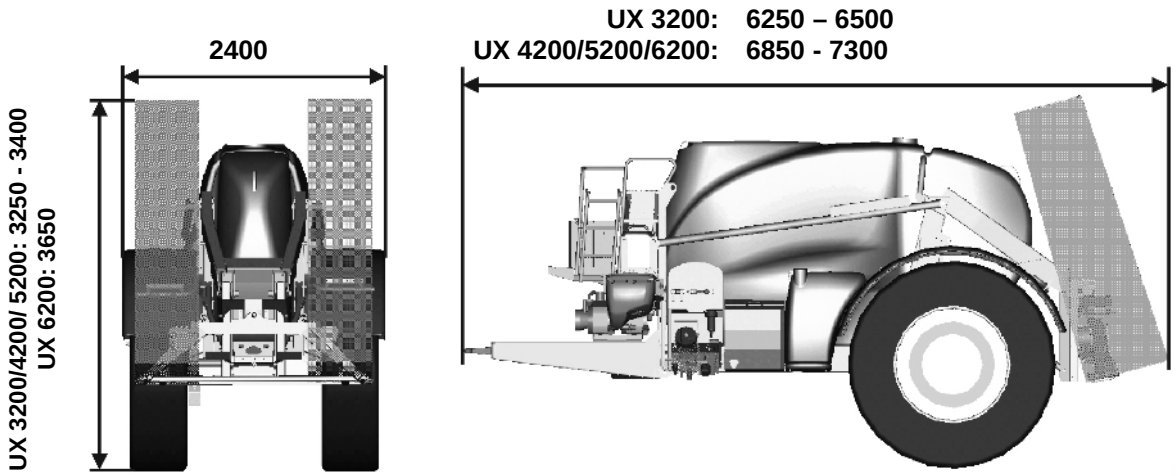
→ Application rate per nozzle = 2.5 l/min



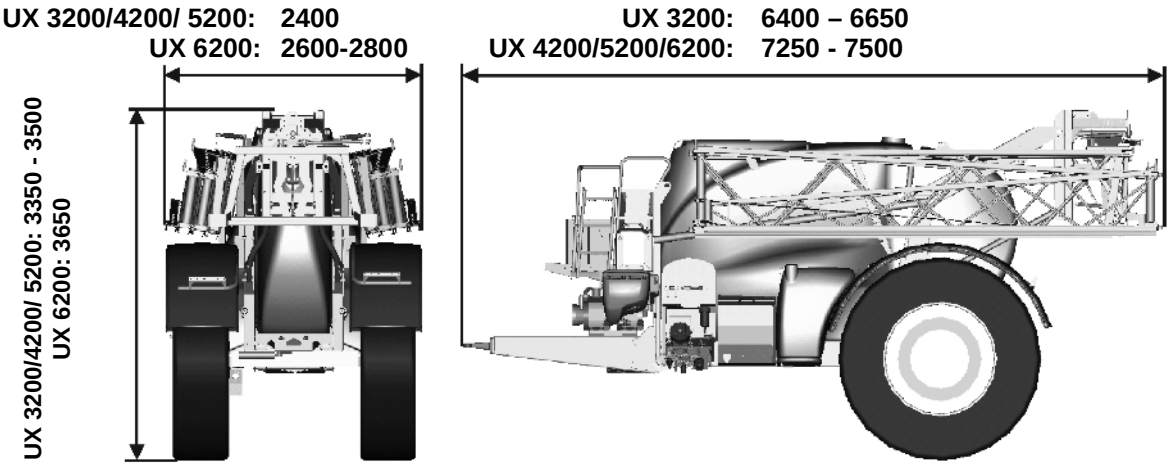
→ **Permissible application rate per hectare = 300 l/ha**

4.13 Technical Data

4.13.1 Total UX measurements including Super-S sprayer boom [mm]



4.13.2 Total UX measurements including Super-L sprayer boom [mm]



(The total heights depend on the tyres.)

4.13.3 Data sheet

Type UX		3200	4200	5200	6200
Basic weight	[kg]	3000 - 4000	3100 - 4100	3200 - 4200	3300-4300
Spray liquid tank Actual volume	[l]	3600	4600	5600	6560
Nominal volume		3200	4200	5200	6200
Filling height from the maintenance platform	[mm]	1180	1080	1400	1400
Permissible system pressure	[bar]	10	10	10	10
Technical residue incl. pump	[l]				
• On the flat		21	23	23	23
• Along the contours		21	23	23	23
o Direction of travel 15 % to left		21	23	23	23
o Direction of travel 15 % to right		21	23	23	23
• Along the gradient					
o 15 % up the slope		35	37	37	37
o 15 % down the slope		28	30	30	30
Working speed	[km/h]	4 - 18			

Central switching mechanism		Electric, part width section valve coupling
Spray pressure adjustment		Electric
Spray pressure setting range	[bar]	0.8 – 10
Spray pressure display		Pressure gauge 0-8 / 25 bar range ∅ 100 mm, safe for liquid fertiliser and digital spray pressure display
Pressure filter		50 (80,100) mesh
Agitator		Infinitely adjustable
Spray rate control		Ground speed related, via job computer
Nozzle height	[mm]	500 - 2500

Payload = permissible total weight - basic weight

DANGER

Exceeding the permitted payload is prohibited.

Risk of accident because of unstable driving conditions.

Carefully determine the payload, and therefore the permitted filling amount for your machine. Not all filling media can be used to fill the tank completely.

4.13.4 Weights basic machine and modules

The basic weight (empty weight) is calculated from the total individual weights of the modules.

Typ **UX Super**	**3200**	**4200**	**5200**	**6200**
	[kg]			
Basic machine	1192	1262	1308	1390
Axle				
Adjusting axles, unbraked	254		-	
Adjusting axles, braked	394		-	
Axle, fixed	360			
Axle, controlled (7.5t / 6.5t)	494		-	
Axle, controlled (9.5t / 8t)	-	573		
Axle, fixed, with hydropneumatic sprung suspension	585			
Axle, controlled, with hydropneumatic sprung suspension	798			
Drawbar				
Straight drawbar, fixed	108			
Straight drawbar, controlled	150			
Hitch draw bar, fixed	113			
Hitch draw bar, controlled	145			
Hitch draw bar UX6200, fixed	245			
Hitch draw bar UniTrail	260			
Tyres (in pairs)				
270/95 R48	412			
300/95 R46	440			
300/95 R52	566			
340/85 R48	524			
380/90 R46	520			
460/80 R38	496			
480/80 R42	632			
480/80 R46 (LI158A8)	700			
520/85 R38 (LI155A8)	600			
520/85 R42 (LI155A8)	744			
520/85 R42 (LI162A8)	806			
520/85 R46 (LI158A8)	824			
620/70 R46	784			
650/65 R38	784			
650/75 R38	824			
Other special equipment	Max. 190			

Sprayer boom weights

- **Super-S booms:**

Working width	[m]	15	18	20	21	21/15	24	27	28
Weight	[kg]	504	519	631	634	629	651	690	691

- **Super-L booms:**

Working width	[m]	21	24	27/19/10	27/22/15	27/21/15	28	28/15
Weight	[kg]	750	760	764	932	932	765	936

Working width	[m]	30/15	32	33	36	36/30/24	39	40
Weight	[kg]	964	1008	1012	1032	1136	1136	1138

4.13.5 Permissible total weight and tyres

The permissible total weight of the machine depends on the

- permitted drawbar load
- permitted axle load
- permitted load capacity per pair of tyres

The permissible total weight is the total of

- the permitted drawbar load and
- one of the following (whichever is smaller):
  - permitted axle load
  - permitted load capacity for each pair of wheels.

Please refer to the following tables for the values used for determining the permissible total weight.

Permitted drawbar load

UX 3200	1500 kg
UX 4200	1800 kg
UX 5200	2000 kg
UX 6200	2400 kg

Permitted axle load

	Adjusting axle		Fixed axle					
Order no.	931215	938071	73301905/ 938172	73301904 938171	73301002/ 931306	73301003/ 931305	936610 / 936612	936611 / 936613
Construction type	Fixed unbraked	Fixed	Controlled	Controlled	Fixed	Controlled	Fixed	Controlled
Track (mm)	1500 - 2250	1500 - 2250	1500 - 1750	1800 - 2250	1800 - 2250	1800 - 2250	2000 - 2250	2000 - 2250
Axle load [kg] (25 km/h)	3000 [1] max.6000 [2]	7500	7500	9500	9500	9500	11500	11500
Axle load [kg] (40 km/ h 50 km/ h)	-	6500	6500	7500	8000	8000	9500	9500
Flange measure-ment [mm]	variable	variable	1800	2000	2000	2000	2100	2100
Impression depth [mm]	+100	+100	+150 - -25	+100 - -125	+100 - -125	+100 - -125	+50 - -75	+50 - -75
Brake system	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

[1] **For Germany only** [2] **Observe the national road traffic regulations**

Load capacity for each pair of wheels

	Tyres	Load index	25 km/h	40 km/h	50 km/h
			permitted load capacity [kg] at air pressure [b]	permitted load capacity [kg] at air pressure [b]	permitted load capacity [kg] at air pressure [b]
1	270/95 R48	LI 142 A8 LI 140 B	5880 3,6	5300 3,6	5000 3,6
2	300/95 R46	LI 146 A8 LI 146 B	6660 3,6	6000 3,6	6000 3,6
3	300/95 R52	LI 148 A8 LI 148 B	6990 3,6	6300 3,6	6300 3,6
4	340/85 R48	LI 151 A8 LI 151 B	7660 3,6	6900 3,6	6900 3,6
5	460/85 R38	LI 146 A8 LI 143 B	6660 1,6	6000 1,6	5450 1,6
6	480/80 R42	LI 148 A8 LI 145 B	6990 1,6	6300 1,6	5800 1,6
7	520/85 R38	LI 155 A8 LI 152 B	8600 1,6	7750 1,6	7100 1,6
8	520/85 R42	LI 155 A8 LI 152 B	8600 1,6	7750 1,6	7100 1,6
9	520/85 R42	LI 162 A8 LI 159 B	10540 1,6	9500 1,6	8750 1,6
10	520/85 R46	LI 158 A8 LI 155 B	9440 1,6	8500 1,6	7750 1,6
11	620/70 R46	LI162 A8 LI162 B	10540 1,6	9500 1,6	9500 1,6
12	650/65 R38	LI 154 A8 LI 151 B	8330 1,6	7500 1,6	6900 1,6
13	480/80 R46	LI 155 A8 LI 152 B	8600 2,1	7750 2,1	7100 2,1
14	380/90 R46	LI 151 A8 LI 148 B	7660 2,4	6900 2,4	6300 2,4
15	480/80 R46	LI 158 A8 LI 155 B	9440 2,4	8500 2,4	7750 2,4
16	650/75 R38	LI 169 A8 LI 169 B	12870 2,4	11600 2,4	11600 2,4

Table 1

Driving with reduced tyre pressure

- The tyre pressure given in table 1 is required for achieving the permitted load capacity.
- If the tyre pressure is lower, the load capacity will also be lower, as shown in table 2.
  If this is the case, please also note the reduced payload of the machine.
- Please additionally follow the specifications of the tyre manufacturer!

Tyres 1 – 5, table 1

Air pressure [b]	2.4	2.8	3.2	3.6
max. load capacity in %	79	86	93	100

Tyres 6 - 12, table 1

Air pressure [b]	1.6	1.8	2.1	2.4
max. load capacity (%)	79	86	93	100

Tyres 13, table 1

Air pressure [b]	1,0	1,3	1,7	2,1
max. load capacity (%)	65	76	88	100

Tyres 14 – 16, table 1

Air pressure [b]	1.0	1.2	1.4	1.6
max. load capacity (%)	79	86	93	100

Table 2

WARNING

Never select air pressure lower than the values given in table 2. Vehicle stability is no longer guaranteed.

Risk of accident.

4.14 Noise emissions data

The workplace-related emissions value (acoustic pressure level) is 74 dB(A), measured during operation at the ear of the tractor driver with the cab closed.

Measuring unit: OPTAC SLM 5.

The noise level is primarily dependent on the vehicle used.

4.15 Required tractor equipment

To be used with the machine, the tractor must fulfil the performance requirements and be equipped with the required electrical, hydraulic and brake connections for the brake system.

Tractor engine power

UX 3200	from 75 kW (100 hp) upwards
UX 4200	from 85 kW (115 hp) upwards
UX 5200	from 95 kW (130 bhp) upwards
UX 6200	from 110 kW (150 bhp) upwards

Electrical system

Battery voltage:	• 12 V (volts)
Lighting socket:	• 7 pin

Hydraulic system

Maximum operating pressure:	• 210 bar
Tractor pump capacity:	• min.25 l/min at 150 bar for hydraulic block (for Profi-folding, optional) • min. 75 l/min at 150 bar for hydraulic pump drive (optional)
Implement hydraulic fluid:	• HLP68 DIN 51524 The implement hydraulic fluid is suitable for the combined hydraulic fluid circuits of all standard tractor brands.
Tractor control units	• Depending on the equipment, see Seite 66.

Brake system (depending on equipment)

Dual circuit service brake system:	• 1 hose coupling (red) for the supply line • 1 hose coupling (yellow) for the brake line
or	
Single circuit service brake system:	• 1 service line hose coupling for the brake line
or	
Hydraulic brake system:	• 1 hydraulic coupling, conforms to ISO 5676

The hydraulic brake system is prohibited in Germany and several other EU countries.

Universal joint shaft (depending on equipment)

Required speed:	• 540 rpm
Direction of rotation:	• Clockwise, viewed from rear toward the tractor.

5 Construction and function of the basic machine

5.1 Functionality

Fig. 21/...

Via the suction chest (G), suction line (2) and suction filter (3), the spraying pump (1) sucks

- the spray liquid from the spray liquid tank (4).
- flushing water from the flushing water tank (5).
  The flushing water serves to clean the spray system.
- fresh water via the external suction port (6).

The liquid that has been drawn in is fed via the pressure hose (7) to the pressure equipment switch tap (A), and from there is fed

- via the self cleaning pressure filter (8) to the part width section valves (9). The part width section valves then send the liquid to separate spray lines.
  Via the additional agitator setting tap (I) on the pressure filter, the stirring performance can be increased when stirring spray liquid.
- to the injector and induction bowl.
  To prepare the spray liquid, pour the relevant quantity of agent required to fill the spray liquid tank into the induction bowl (10) and evacuate into the spray liquid tank.
- directly into the spray liquid tank (4).
- to the internal (B) or external cleaning switch tap (C).

The agitator pump (11) supplies the main agitator (12) in the spray liquid tank. In its switched-on state, the main agitator ensures a homogeneous spray liquid in the spray liquid tank. The stirring performance of the main agitator can be adjusted infinitely using the main agitator setting tap (H).

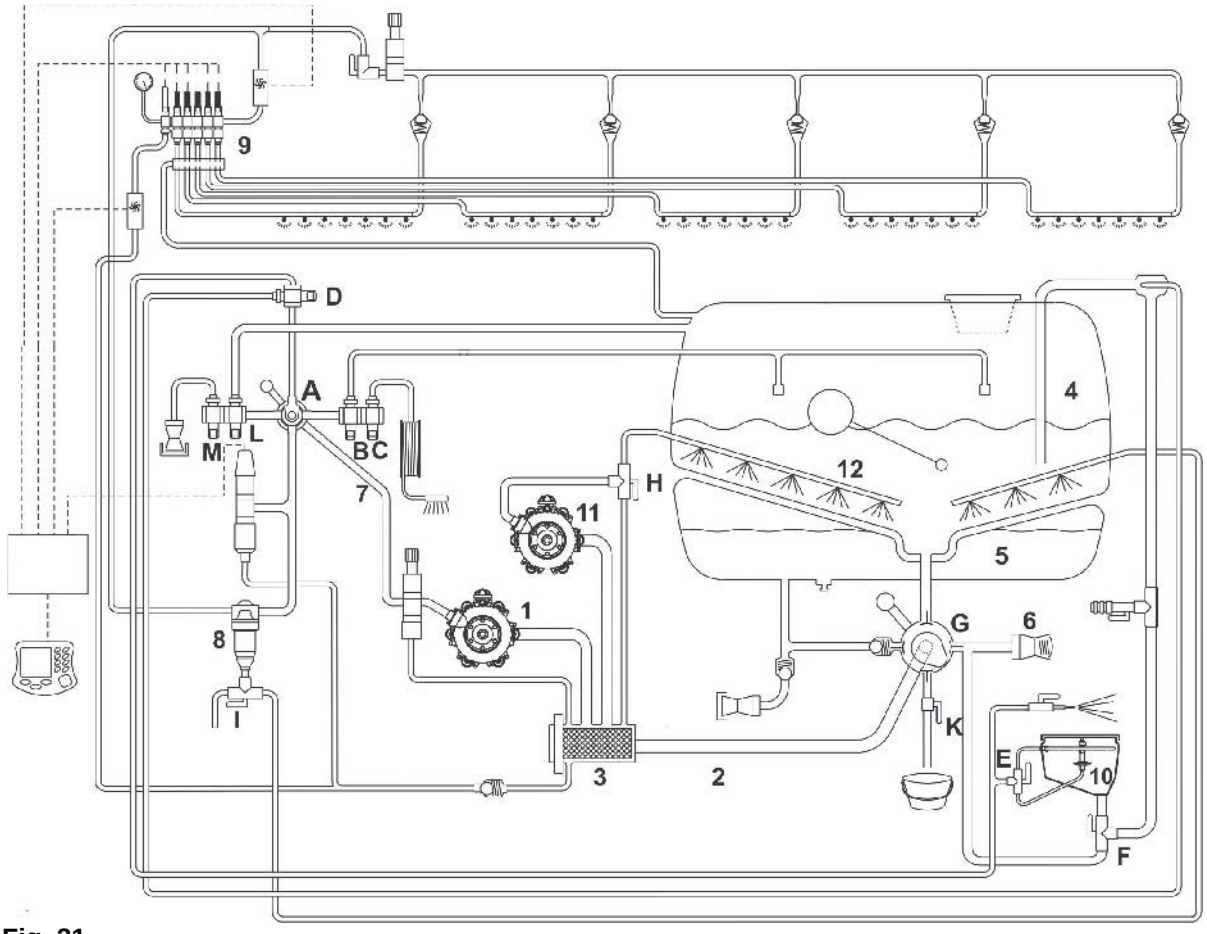


Fig. 21

5.2 Control terminal

The relevant operation modes are set centrally on the control terminal, using the various control elements.

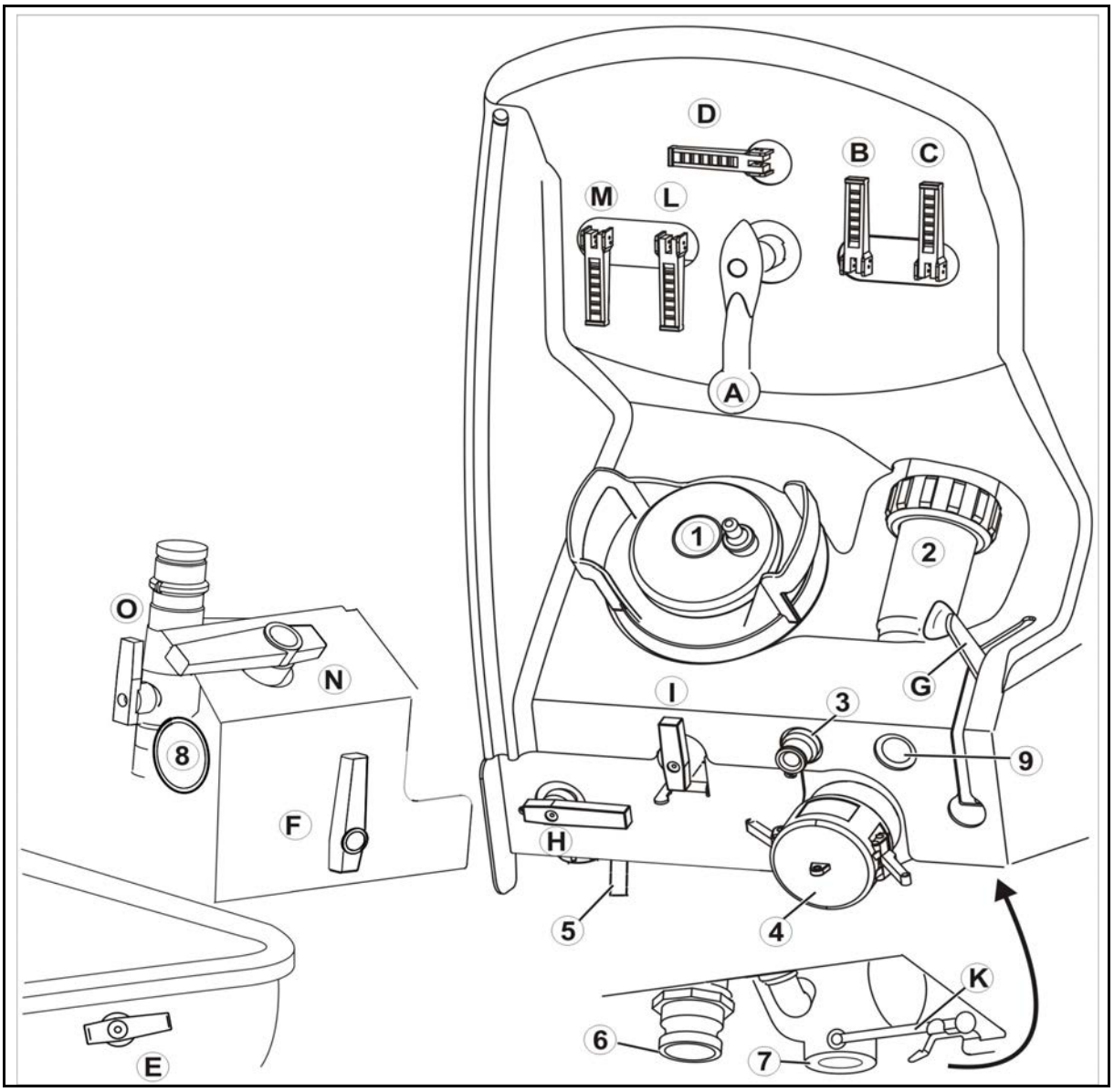


Fig. 22

(1) Suction filter
(2) Pressure filter
(3) Flushing water tank filling connection
(4) Spray liquid tank filling connection (via suction hose)
(5) Pressure filter outlet
(6) Quick emptying via pump
(7) Suction filter / spray liquid outlet
(8) Pressure filling connection (optional)
(9) Button for comfort equipment (optional)
(A) Pressure equipment switch tap
(B) Internal cleaning switch tap
(C) External cleaning switch tap
(D) Injector switch tap
(E) Ring line / canister flushing switch tap
(F) Evacuate induction bowl / Ecofill switch tap
(G) Suction chest manual operation
(H) Main agitator switch tap
(I) Additional agitator / drain residue switch tap
(K) Suction filter / drain spray liquid switch tap
(L) Filling switch tap
(M) Quick emptying switch tap
(N) Switch tap for pressure filling connection
(O) Ecofill switch tap

- **A - Pressure equipment switch tap**
  - o Spraying operation
  - o Cleaning
  - o Injector mode
  - o Fill spray liquid tank
- **B - Internal cleaning switch tap**
- **C - External cleaning switch tap**
- **D - Injector switch tap**

Optional:

- **L – Filling switch tap**
- **M – Quick emptying switch tap**

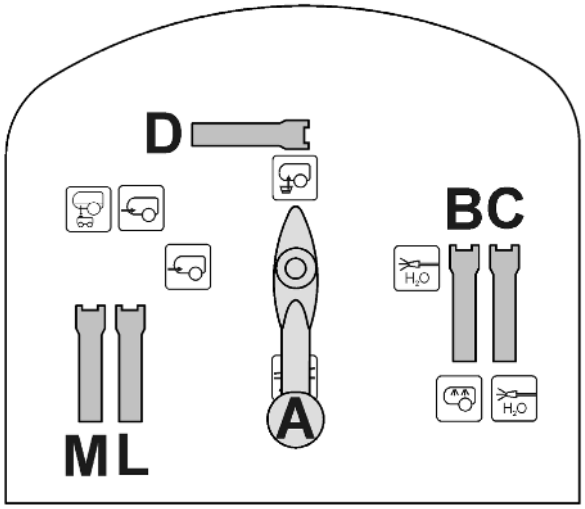


Fig. 23

- **E - Ring line / canister flushing switch tap**
  - ○ **0** Zero setting
  - ○ Ring line
  - ○ Canister flushing

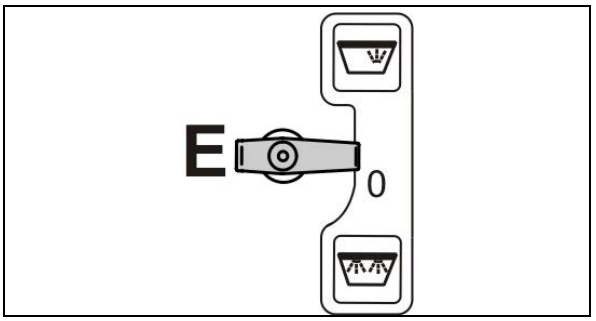


Fig. 24

- **F - Evacuate switch tap for induction bowl / Cut in injector**
  - ○ **0** Zero setting
  - ○ Evacuate induction bowl
  - ○ Draw in additionally from an external source via an injector:

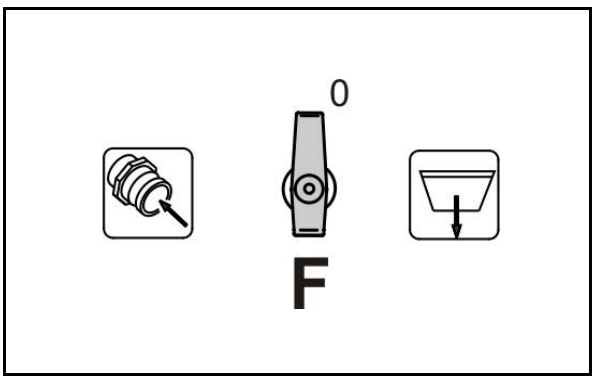


Fig. 25

- **G - Suction chest manual operation**
  - ○ Sucking from flushing water tank
  - ○ Sucking from spray tank
  - o Sucking via suction hose

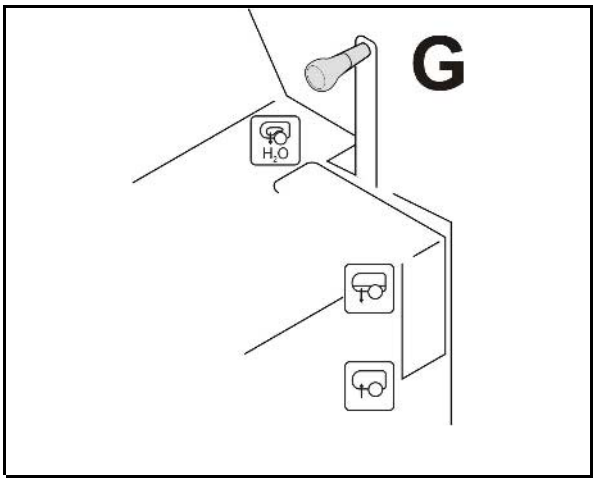


Fig. 26

When operating the suction chest manually, there may be a squeaking noise. This noise does not signify any danger.

- **H - Main agitator switch tap**

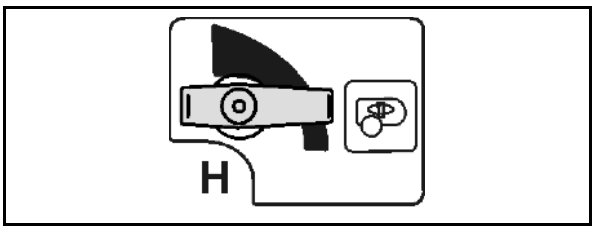


Fig. 27

- **I - Additional agitator switch tap**
  - ○ Release residue in the pressure filter

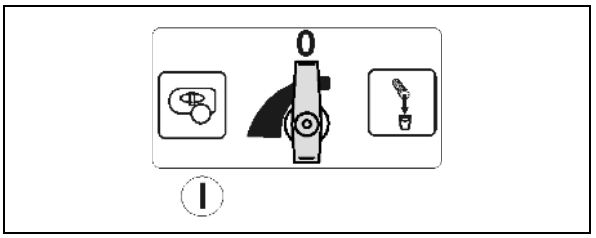


Fig. 28

All stop taps are

- open when lever position is in direction of flow
- closed when lever position is transverse to direction of flow

5.3 PTO shaft

The wide angle PTO shaft takes on the power transmission between tractor and machine.

Fig. 29:

- Wide angle PTO shaft (860 mm) for straight drawbar and hitch draw bar
- Russia only:
  Wide angle PTO shaft (860 mm) for straight drawbar and hitch draw bar
- PTO shaft UniTrail
- Wide angle PTO shaft W100E (810 mm) for open straight drawbar, hitched at the top

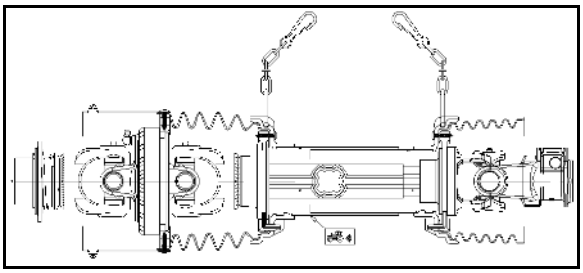


Fig. 29

WARNING

Risk of crushing from the tractor and machine unintentionally starting up or rolling.

Only couple/uncouple the wide angle PTO shaft from the tractor, if the tractor and machine are secured against unintentional starting and rolling.

WARNING

Risk of being caught and drawn in by the unguarded PTO shaft or due to damaged safety devices.

- Never use the PTO shaft if the safety device is missing or damaged, or without correctly using the supporting chain.
- Before each use, check that
  - o all PTO shaft protective devices are installed and fully functional.
  - o the clearance around the PTO shaft is sufficient in all operating positions. Insufficient clearance will result in damage to the PTO shaft.
- Attach the supporting chains in a way that ensures a sufficient swivel range of the PTO shaft in all operating positions. Supporting chains must not become caught on machine or tractor parts.
- Have any damaged or missing parts of the PTO shaft replaced immediately with genuine parts from the PTO shaft manufacturer.
  Note that only a specialist workshop may repair a PTO shaft.
- With the machine uncoupled, place the PTO shaft in the holder provided. This protects the PTO shaft from damage and dirt.
  - o Never use the supporting chain of the PTO shaft to suspend the uncoupled PTO shaft.

WARNING

Risk of being caught and drawn in by unguarded PTO shaft parts in the power transmission area between the tractor and driven machine.

Work only when the drive between the tractor and driven machine is fully guarded.

- The unguarded parts of the PTO shaft must always be guarded by a shield on the tractor and a PTO shaft guard on the machine.
- Check that the shield on the tractor or the PTO shaft guard on the machine and the safety devices and guards of the extended PTO shaft overlap by at least 50 mm. If they do not, you must not power the machine via the PTO shaft.

- Use only the PTO shaft provided or one of the same type.
- Read and follow the operating manual provided for the PTO shaft. Correct use and maintenance of the PTO shaft prevents serious accidents.
- When coupling the PTO shaft
  - refer to the operating manual provided for the PTO shaft.
  - observe the permissible drive speed of the machine.
  - observe the correct installation length of the PTO shaft. Refer to the section "Adjusting the length of the PTO shaft to the tractor", page 141.
  - observe the correct installation position of the PTO shaft. The tractor symbol on the protective tube of the PTO shaft identifies the tractor-side connection of the PTO shaft.
- Always mount the overload or freewheel clutch on the machine if the PTO shaft has an overload or freewheel clutch.
- Before switching on the universal joint shaft, read and follow the safety precautions for universal joint shaft operation in the section "Safety information for the user", page 34.

5.3.1 Coupling the PTO shaft

WARNING

Risk of crushing or impact if there is insufficient clearance when coupling the PTO shaft.

Couple the PTO shaft with the tractor before coupling the machine with the tractor. This will ensure the necessary clearance for safe coupling of the PTO shaft.

1. Drive the tractor up to the machine, leaving a clearance (approx. 25 cm) between the tractor and the machine.
2. Secure the tractor against unintentional starting and rolling, see the section "Securing the tractor against unintentional starting and rolling", starting on page **143**.
3. Check whether the tractor universal joint shaft is switched off.
4. Clean and grease the tractor universal joint shaft.
5. Fit the latch of the PTO shaft over the universal joint shaft of the tractor until the latch is heard to engage. When coupling the PTO shaft, refer to the operating manual provided for the PTO shaft and observe the permissible universal joint shaft speed of the machine.

The tractor symbol on the protective tube of the PTO shaft identifies the tractor-side connection of the PTO shaft.

6. Secure the PTO shaft guard using the supporting chain(s) to prevent movement.
   - 6.1 Fasten the supporting chain(s) so that it as perpendicular to the PTO shaft as possible.
   - 6.2 Attach the supporting chain(s) in a way that ensures sufficient swivel range of the PTO shaft in all operating positions.

CAUTION

Supporting chains must not become caught on machine or tractor parts.

7. Check that there is sufficient clearance around the PTO shaft in all operating conditions. Insufficient clearance will result in damage to the PTO shaft.
8. Provide the necessary clearance (if required).

5.3.2 Uncoupling the PTO shaft

WARNING

Risk of crushing or impact if there is insufficient clearance when uncoupling the PTO shaft.

First uncouple the machine from the tractor before uncoupling the PTO shaft from the tractor. This will ensure the necessary clearance for safe uncoupling of the PTO shaft.

CAUTION

Risk of burning on hot components of the PTO shaft.

This danger can cause minor to serious injuries to the hands.

Do not touch components of the PTO shaft that have become hot (particularly clutches).

- Store the uncoupled PTO shaft in the holder provided. This protects the PTO shaft from damage and dirt.

  Never use the supporting chain on the PTO shaft to hang up the uncoupled PTO shaft.
- Clean and lubricate the PTO shaft if it is going to be out of use for a long time.

1. Uncouple the machine from the tractor. Refer to the section "Uncoupling the machine", page 150.
2. Drive the tractor up to the machine, leaving a clearance of approximately 25 cm between the tractor and the machine.
3. Secure the tractor against unintentional starting and rolling, see the section "Securing the tractor against unintentional starting and rolling", starting on page 143.
4. Pull the latch of the PTO shaft off the universal joint shaft of the tractor. Observe the operating manual supplied with the PTO shaft when uncoupling the PTO shaft.
5. Place the PTO shaft in the holder provided.
6. Clean and lubricate the PTO shaft if it is not going to be used for a longer period of time.

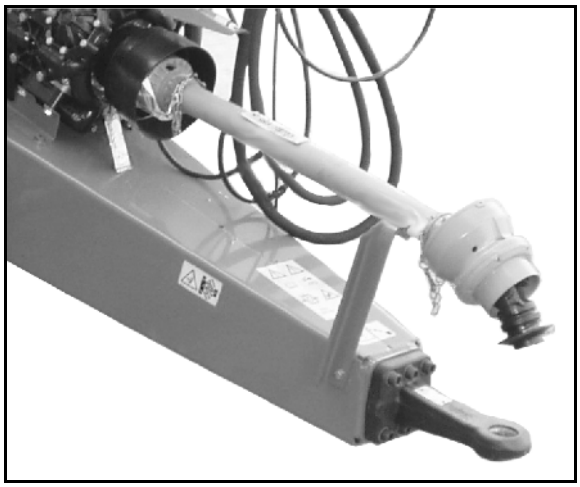
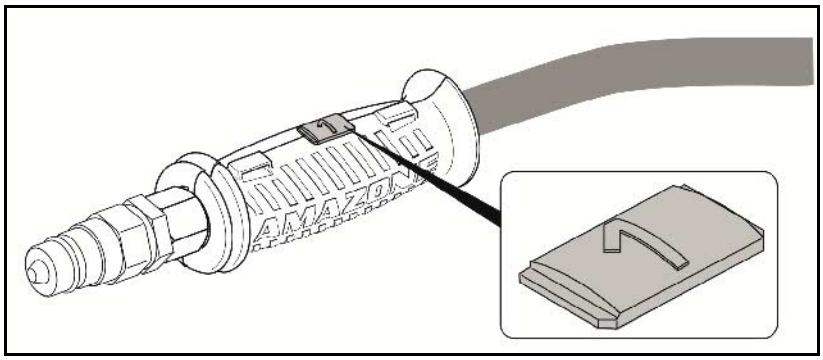


Fig. 30

5.4 Hydraulic connections

- All hydraulic hose lines are equipped with grips.

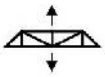
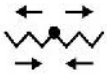
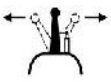
  Coloured markings with a code number or code letter have been applied to the gripping sections in order to assign the respective hydraulic function to the pressure line of a tractor control unit!



  Films are stuck on the implement for the markings that illustrate the respective hydraulic function.

- The tractor control unit must be used in different types of activation, depending on the hydraulic function.

Latched, for a permanent oil circulation	
Tentative, activate until the action is executed	
Float position, free oil flow in the control unit	

Folding using tractor control units		Function			Hose identification	
yellow	1		**Height adjustment**	raise	Double acting	
	2			lower		
yellow	3		**Lift module**	raise	Double acting	
	4			lower		
green	1		**Fold boom**	fold out	Double acting	
	2			fold in		
natural	1		**Tilt adjustment (optional)**	raise left boom	Double acting	
	2			raise right boom		
blue	1		**Steering drawbar (optional)**	extend hydraulic cylinder (machine left)	Double acting	
	2			retract hydraulic cylinder (machine right)		
blue	3		**Stand (optional)**	raise	Double acting	
	4			lower		

Profi-folding

Folding using tractor control units		Function	Hose identification	
red	P	Permanent oil circulation	Single acting	
red	T	Pressure-free return flow		
Red	LS	Load sensing control line		

WARNING

Risk of infection from hydraulic fluid escaping at high pressure.

When coupling/uncoupling the hydraulic hose line, ensure that the hydraulic system is not under pressure on the tractor or machine side.

If you are injured by hydraulic fluid, contact a doctor immediately.

Profi-folding:

Maximum permissible pressure in oil return: 5 bar

Therefore do not connect the oil return to the tractor control unit, but to a pressure-free oil return flow with a large plug coupling.

WARNING

For the oil return, use only DN16 lines and select short return paths.

Pressurise the hydraulic system only when the free return has been correctly coupled.

Install the coupling union (supplied) on the pressure-free oil return flow.

Profi- folding LS:

The Profi-folding LS contains an accumulator and is provided for load-sensing operation.

Using machines with Profi-folding LS in load-sensing operation to reduce hydraulic system energy loss, see page 145.

5.4.1 Coupling hydraulic hose lines

WARNING

Risk of crushing, cutting, being trapped or drawn in, or impact through faulty hydraulic functions when hydraulic hose lines are incorrectly connected.

When coupling the hydraulic hose lines, please note the coloured markings on the hydraulic plugs.

- Check the compatibility of the hydraulic fluids before connecting the machine to the tractor hydraulic system.
  Do not mix any mineral oils with biological oils.
- Observe the maximum permissible hydraulic fluid pressure of 200 bars.
- Only couple clean hydraulic connectors.
- Plug the hydraulic plug(s) into the hydraulic sockets until you can feel the hydraulic plug(s) locking.
- Check the coupling points on the hydraulic hose lines, to see if they are sitting correctly and are sealed.

1. Swivel the actuation lever on the control valve on the tractor to float position (neutral position).
2. Clean the hydraulic plugs on the hydraulic hose lines before coupling the hydraulic hose lines with the tractor.
3. Connect the hydraulic hose line(s) to the tractor control unit(s).

5.4.2 Disconnecting hydraulic hose lines

1. Swivel the actuation lever on the tractor control unit on the tractor to float position (neutral position).
2. Unlock the hydraulic connectors from the hydraulic sockets.
3. Protect the hydraulic plug and hydraulic socket against soiling using the dust protection caps.
4. Store the hydraulic hose lines in the hose cabinet.

5.5 Air pressure brake system

Keeping to the service interval is essential for proper functioning of the dual circuit service brake system.

Fig. 31/...

1. Braking force regulator with hand lever for adjusting the braking force manually. The braking force is set in 4 stages, depending on the load status of the trailed sprayer.
   - ○ Sprayer filled = full load
   - ○ Sprayer partly filled = ¾, ½ , ¼
   - o Sprayer empty = empty

(2) Release valve with actuator button (3)

(3) Actuator button;

- ○ press in until it stops and the service brake system releases, e.g. for shunting the uncoupled trailed sprayer.
- ○ pull it out as far as it will go, and the trailed sprayer is braked again by the supply pressure coming from the air reservoir.

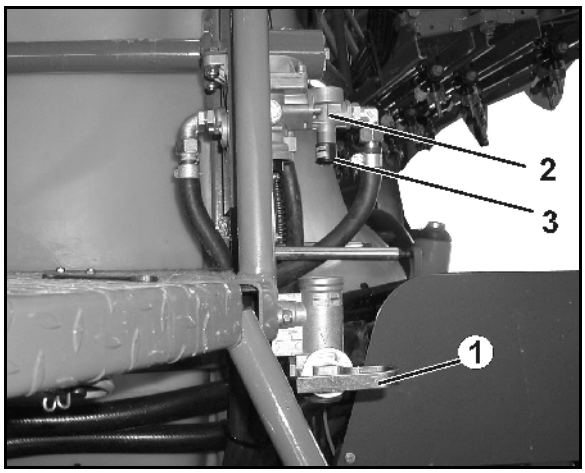


Fig. 31

Fig. 32/...

(1) Air reservoir

(2) Drainage valve for condensate.

(3) Test connection

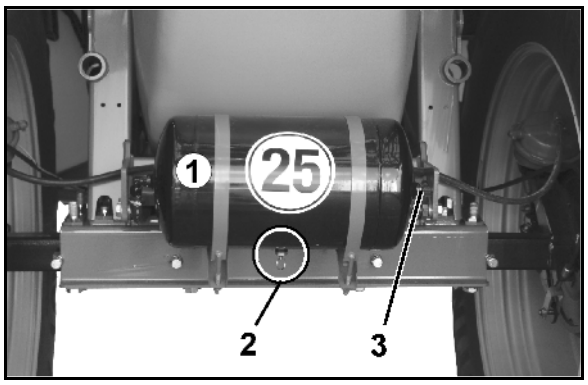


Fig. 32

- **Dual-circuit pneumatic braking system**

Fig. 33/...

(1) Hose coupling on brake line (yellow)

(2) Hose coupling on supply line (red)

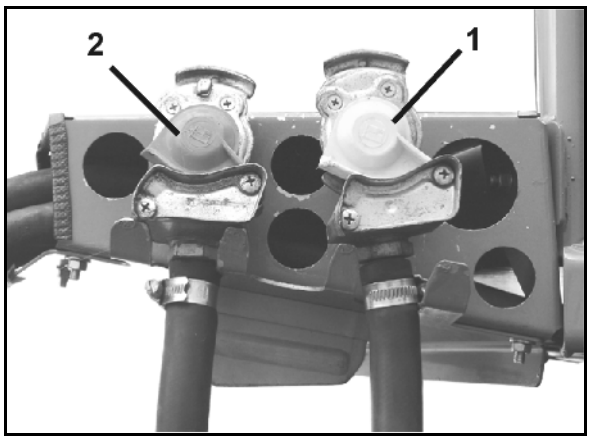


Fig. 33

- **Single circuit pneumatic braking system**

Fig. 34/...

(1) Hose coupling (black)

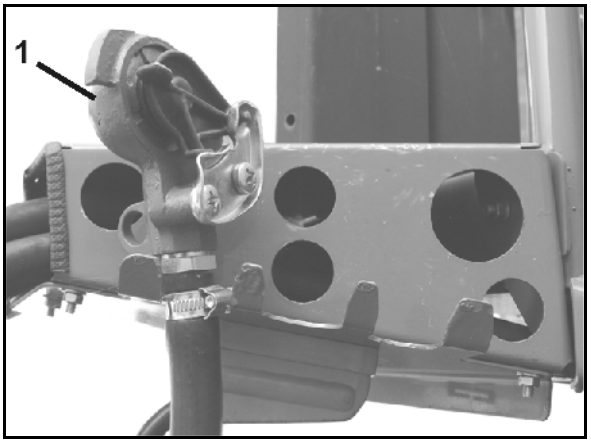


Fig. 34

5.5.1 Automatic load-dependent braking force regulator (ALB)

For machines with ALB, the braking force is regulated according to the tank fill level via a float in the tank.

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through incorrectly functioning brake system.

You must not change the adjustment measurement on the automatic load-dependent braking force regulator. The adjustment measurement must match the value given on the Haldex ALB plate.

5.5.2 Coupling the brake system

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through incorrectly functioning brake system.

- When coupling the brake and supply line, ensure that
  - the sealing rings on the hose couplings are clean.
  - the sealing rings on the hose couplings seal properly.
- Replace damaged sealing rings immediately.
- Drain the air reservoir before the first transport of the day.
- Only start up with the machine coupled if the pressure gauge on the tractor shows 5.0 bar.

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through the accidentally rolling machine, if the service brake is released.

Dual-circuit pneumatic braking system:

- Always couple the hose coupling on the brake line (yellow) first and then the hose coupling on the supply line (red).
- The service brake on the machine is immediately released from the brake setting if the red hose coupling is coupled.

1. Open the cover on the hose coupling on the tractor.
2. Pneumatic braking system:

- **Dual circuit** pneumatic braking system:

  2.1 Fasten the brake line hose coupling (yellow) in the yellow coupling on the tractor, as specified.

  2.3 Fasten the supply line hose coupling (red) in the red coupling on the tractor, as specified.

  → When coupling the supply line (red), the supply pressure coming from the tractor automatically presses out the actuator button for the release valve on the trailer brake valve

- **Single circuit** pneumatic braking system:

  2.1 Fasten the hose coupling (black) to the tractor, as specified.

3. Loosen the parking brake and/or remove the wheel chocks.

5.5.3 Uncoupling the brake system

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through from the accidentally rolling machine caused by unintentionally releasing the service brake.

Dual-circuit pneumatic braking system:

- Always uncouple the supply line hose coupling (red) first, and then the brake line hose coupling (yellow).
- The service brake of the machine only moves into the brake position when the red hose coupling has been uncoupled.
- Always keep to this order, otherwise the service brake system will trip and may set the unbraked machine moving.

When the machine is uncoupled or pulled away from the trailer, air is vented from the trailer brake valve supply line. The trailer brake valve is automatically switched and operates the service braking system independently of the automatic, load-dependent braking force regulator.

1. Secure the machine against unintentionally rolling. To do this, use the parking brake and/or wheel chocks.
2. Pneumatic braking system

- **Dual circuit** pneumatic braking system:

  2.1 Release the supply line hose coupling (red).

  2.2 Release the brake line hose coupling (yellow).

- **Single circuit** pneumatic braking system:

  2.1 Release the hose coupling (black).

3. Close the hose coupling covers on the tractor.

5.6 Hydraulic service brake system

To control the hydraulic service brake system, the tractor requires hydraulic braking equipment.

5.6.1 Coupling the hydraulic service brake system

Only couple clean hydraulic couplings.

1. Remove the protective caps.
2. Clean the hydraulic plug and hydraulic socket if necessary.
3. Insert the tractor's hydraulic plug into the machine's hydraulic socket.
4. Tighten the hydraulic screw union (if present) hand-tight.

5.6.2 Uncoupling the hydraulic service brake system

1. Loosen the hydraulic screw union (if present).
2. Protect the hydraulic plug and hydraulic socket against soiling using the dust protection caps.
3. Store the hydraulic hose line in the hose cabinet.

5.6.3 Emergency brake

In event of the machine being released from the tractor during travel, the emergency brake will brake the machine.

Fig. 35/…

(1) Pulling cable

(2) Brake valve with pressure accumulator

(3) Hand pump to relieve the brake

(A) Brake released

(B) Brake applied

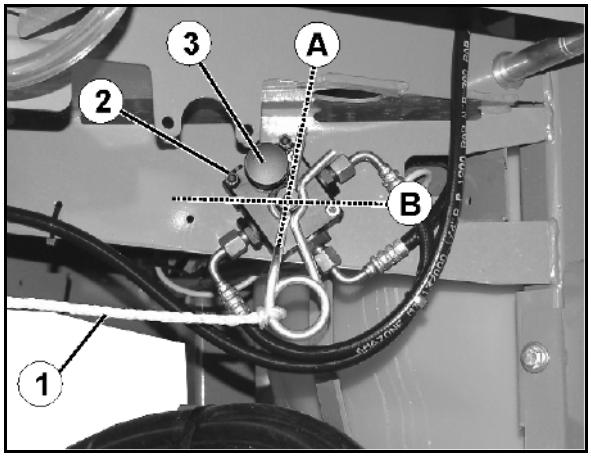


Fig. 35

DANGER

Before travel, set the brake to the application position.

For this purpose:

1. Secure the pulling cable to a fixed point on the tractor.
2. Apply the tractor brake with the tractor engine running and hydraulic brake connected.

→ Pressure accumulator of the emergency brake is being charged.

DANGER

Risk of accident through brake malfunction!
After withdrawing the safety splint (e.g. when activating the emergency brake), it is essential to insert the safety splint into the brake valve from the same side (Fig. 35). Otherwise the brake will not function.

After reinserting the safety splint, carry out a brake test for the service brake and the emergency brake.

When the implement is uncoupled, the pressure accumulator presses hydraulic oil:

- into the brake and decelerates the implement,

or

- into the hose line to the tractor and impedes the coupling of the brake line to the tractor.

In these cases, relieve pressure using the hand pump on the brake valve.

5.7 Parking brake

When the parking brake is on, it secures the uncoupled machine against unintentional rolling. The parking brake is operated by turning the crank, which in turn operates the spindle and bowden cable.

- Crank; locked in idle position.

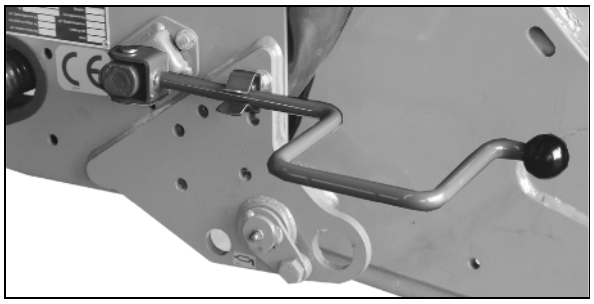


Fig. 36

- Crank position for releasing / applying in the end area.

  (the parking brake requires approx. 20 kg manual force to be applied).

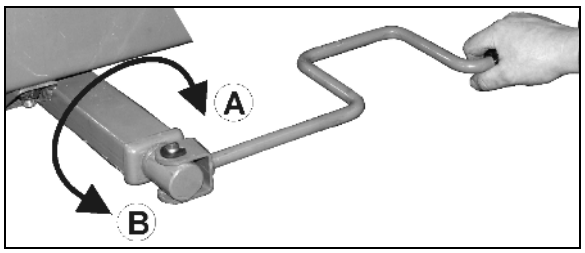


Fig. 37

- Crank position for quick releasing / applying.

  (A) Apply the tractor parking brake.

  (B) Release parking brake.

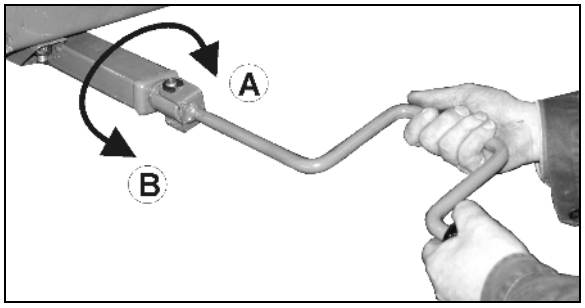


Fig. 38

- Correct the setting of the parking brake if the spindle's tension is no longer sufficient.
- Ensure that the bowden cable is not lying or rubbing against other vehicle parts.
- When the parking brake is off, the bowden cable must be slightly slack.

5.8 Foldable wheel chocks

Each of the wheel chocks is attached with a thumb bolt on the right side of the implement.

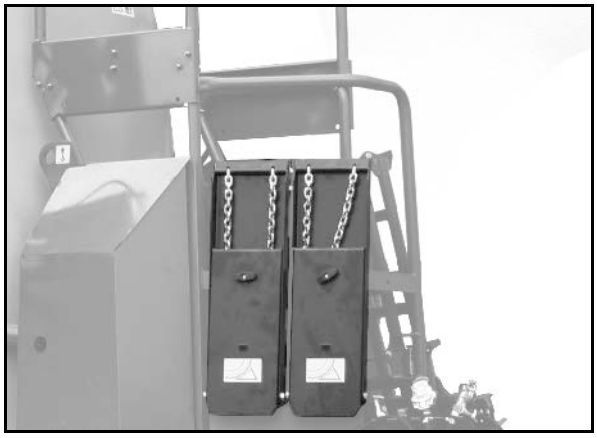


Fig. 39

Put the foldable wheel chocks into operating position by pressing the button and apply directly on the wheels before uncoupling.

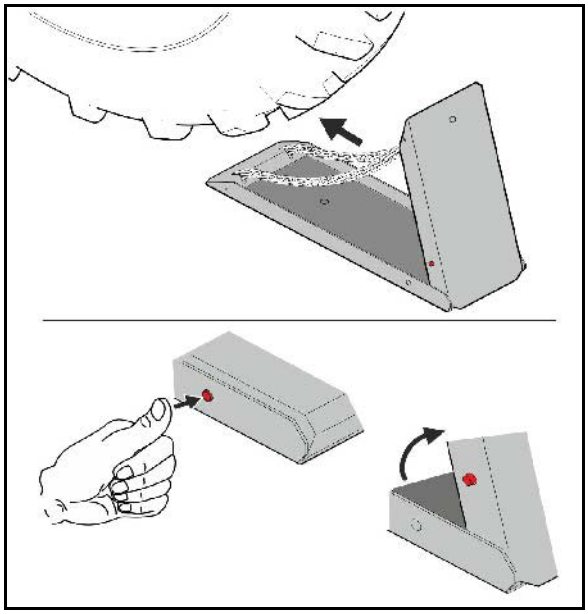


Fig. 40

5.9 Safety chain for implements without brake system

Implements without a brake system or with a single-line brake system must be equipped with a safety chain in compliance with local country regulations.

The safety chain must be correctly fixed to a suitable position on the tractor before transporting.

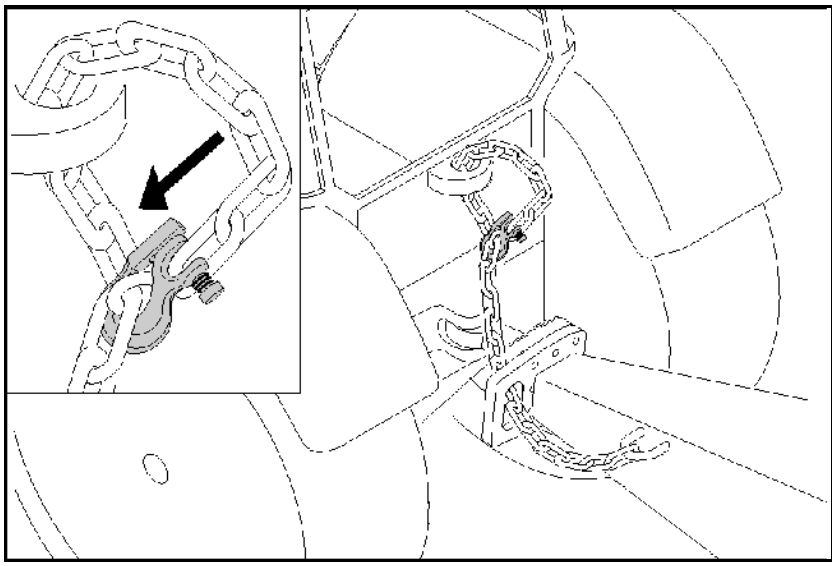


Fig. 41

5.10 Drawbars

If using automatic trailer couplings, check that the connection is secure after coupling. If using non-automatic trailer couplings, secure the coupling pin positively after inserting it.

- **Straight drawbar (Fig. 42)**

The straight drawbar is fastened in the tractor pin coupling.

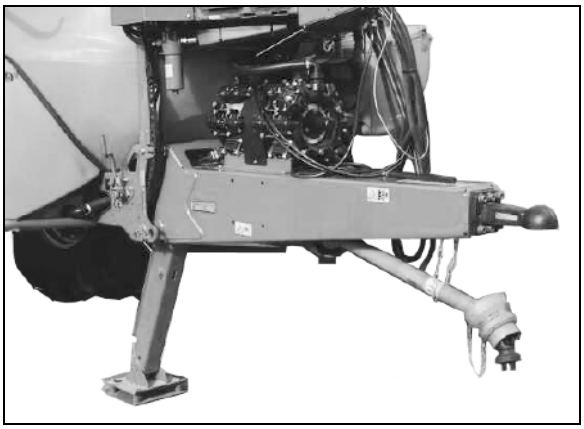


Fig. 42

- **Hitch drawbar (Fig. 43)**

The hitch drawbar is fastened in the tractor hitch hook.

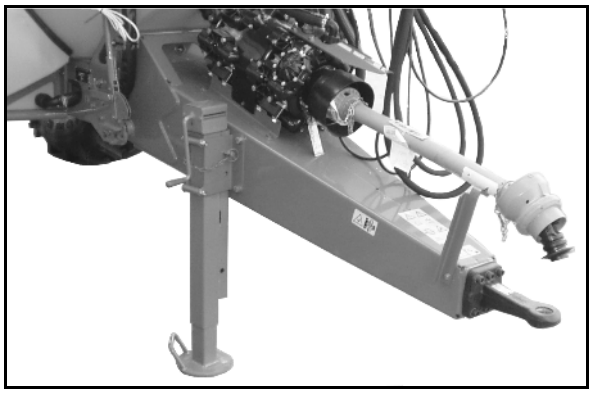


Fig. 43

- **Draw bar for UniTrail steering system**

The machine is coupled to the tractor using the draw bar with Category II lower link pins.

Note the separate operating manual for this purpose!

WARNING

Risk of accidents if the connection between machine and tractor separates!

Always use ball sleeves with sockets and integrated linch pins.

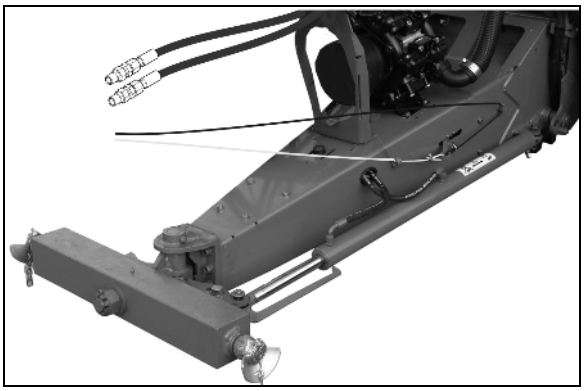


Fig. 44

5.11 AutoTrail tracking control

AutoTrail tracking control for automatic, virtually 100% precise tracking captures the position of the angle of the drawbar (Fig. 45/1) to determine the direction of travel of the tractor.

If the position of the drawbar deviates from the tractor's central position (drawbar lined up with tractor's direction of travel), AutoTrail realigns

- the following steering axle
- the tracking steering drawbar

until the central position is reached again.

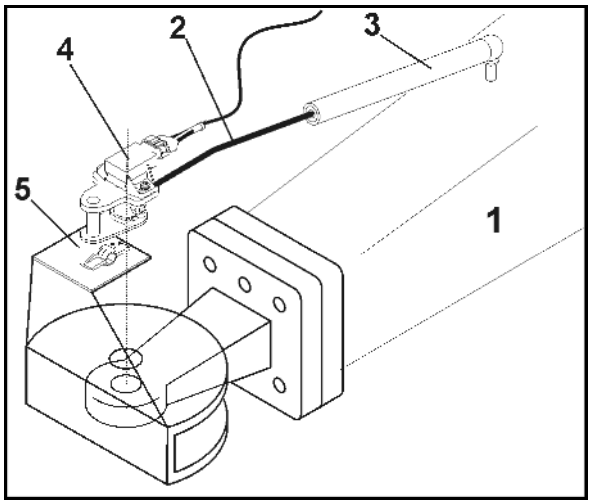


Fig. 45

Connecting the AutoTrail position encoder

1. Insert the rod (Fig. 45/2) into the plastic bush (Fig. 45/3) stecken.
2. Insert the position encoder (Fig. 45/4) into the holder (Fig. 45/5).
3. Align the potentiometer in direction of travel (cable to rear) and secure with a locking screw against rotation.

See operating manual for software ISOBUS.

A precondition for the perfect functioning of the hydraulically operated following steering axle/drawbar is a correctly performed AutoTrail calibration

Perform a AutoTrail calibration

- before initial operation.
- if there are any deviations between the following steering axle control shown on the display and the actual following steering axle control.

Safety functions for preventing the machine from tipping over when the AutoTrail is switched on.

Safety functions.

- If the sprayer boom is raised higher than 1.5 m:
- If the boom is folded in transport position:

→ AutoTrail is switched off (once the drawbar is in its central position).

- If an operational speed greater than 20 km/h is reached::

→ AutoTrail axle / drawbar moves automatically to the central position and remains in on-road mode.

DANGER

Risk of accident from the machine tipping over.

- For transportation, move the steering drawbar/steering axle to the transport position.
- Transportation while AutoTrail is switched on is prohibited.

On the control terminal, for this purpose:

1. Move steering drawbar / steering axle to the central position (steering drawbar / wheels in line with machine).
   On the control terminal, for this purpose
   1.1 Put AutoTrail into manual mode.
   1.2 , Align steering drawbar / steering axle manually.

→ AutoTrail stops automatically once the central position has been reached.

2. Switch off control terminal.
3. Actuate tractor control unit *red*.

→ Switch off oil circulation.

4. For steering drawbar only:
   Secure the steering draw bar into position 0 by closing the stop tap.

5.11.1 AutoTrail steering drawbar

Fig. 46/...

(1) Steering drawbar

(2) Control cylinder

(3) Ball valve for locking the hydraulic cylinder during transportation

0 → operation locked

I → operation unlocked

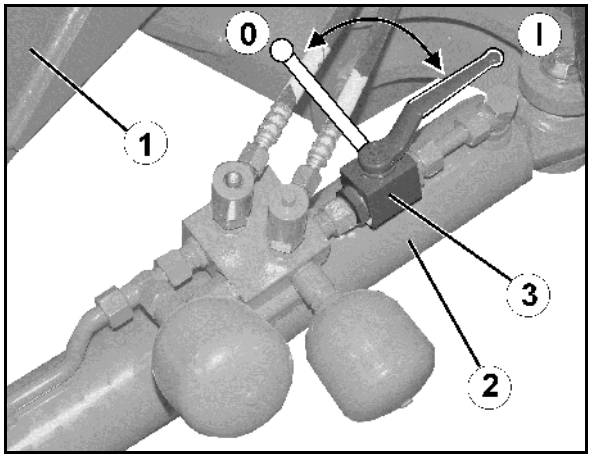


Fig. 46

DANGER

The use of the AutoTrail steering drawbar

- **for precise tracking on sloping terrain is prohibited.**

  Only use the AutoTrail steering drawbar on level ground. Unevenness of a maximum 5° (due to furrows) is permitted.

- **for manoeuvring while reversing is prohibited.**

Risk of the machine tipping over.

- **When using the tracking steering drawbar, there is a risk of tipping over when performing a turning manoeuvre on a headland, and on tight bends at high speeds, due to the shifting of the centre of gravity when the steering drawbar is pushed in.**
- **The risk of tipping over is especially great when travelling downhill on uneven ground.**
- **Adapt your driving accordingly and reduce speed when performing a turning manoeuvre on a headland, so that you are in complete control of the tractor and trailed sprayer.**

To prevent the sprayer from tipping over, observe the following general principles:

- Avoid sudden, sharp turns.
- Reduce speed before turning.
- While turning, do not brake suddenly if still steering.
- Exercise extreme caution when steering in furrows.

5.11.2 AutoTrail steering axle

Fig. 47/...

(1) Following steering axle

(2) Control cylinder

For machines with

- a track width less than 1800 mm,
- tyre widths greater than 500 mm:

1. Turn the steering axis as far as it will go via the manual control on the control terminal so that collisions do not occur.
2. Tighten the locking screw (Fig. 48/1) in the brake drum and secure with a lock nut (Fig. 48/2).

Perform the same setting for both sides.

Depending on the equipment, the locking screws are either already fitted or supplied.

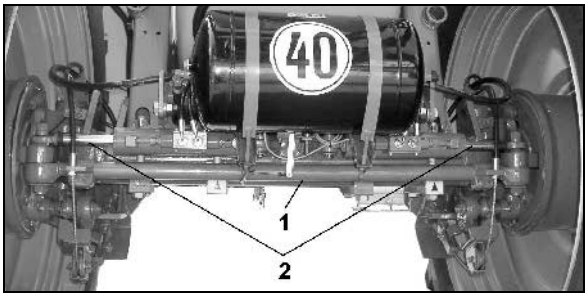


Fig. 47

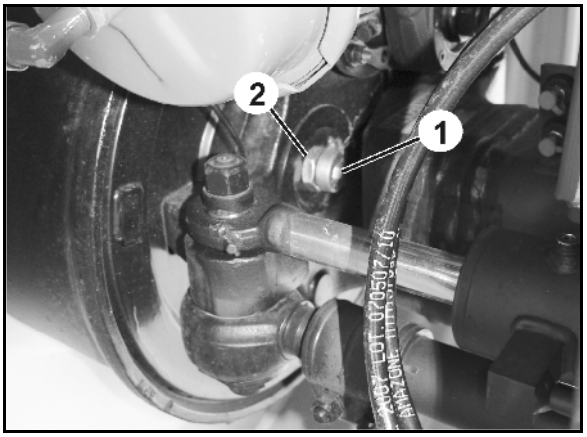


Fig. 48

5.12 Tracking control via tractor control unit

When working on sloping terrain (sprayer slips off),

- the **tractor control unit *blue***

can be used from the comfort of the tractor seat to manually steer the steering drawbar so that it is tracking precisely.

When steering manually, hydraulic control reduces damage to the crop, particularly with regard to drill crops (e.g. potatoes or vegetables) when driving or manoeuvring in and out of the drills.

Turning circle d_{wk} > 18 m.

Transportation

DANGER

Risk of accident from the machine tipping over.

Move the steering drawbar to the transport position for transportation.

Actuate tractor control unit *blue* until the drawbar is at the zero setting (Fig. 49/1). Pay attention to the pointer and scale on the hydraulic cylinder.

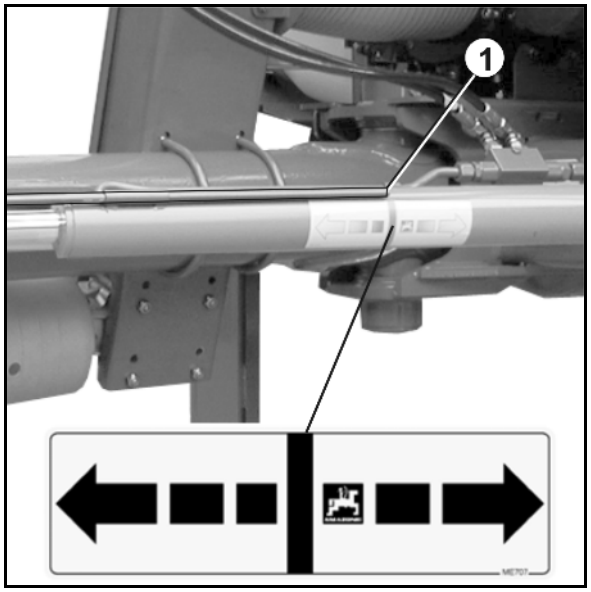


Fig. 49

5.13 Hydraulic stand

The hydraulically operated stand (Fig. 50/1) supports the uncoupled trailed sprayer. It is operated via a double-acting control valve.

Tractor control unit *blue* :

DANGER

When resting the machine on the hydraulic stand, it must not be more than 30° off the vertical.

Fig. 50

- When operating the stand, step on the tractor clutch to release the pin from the yoke bar / hitch.
- The red mark (Fig. 51/1) on the stand control display is visible if the machine is resting on the hydraulic stand.

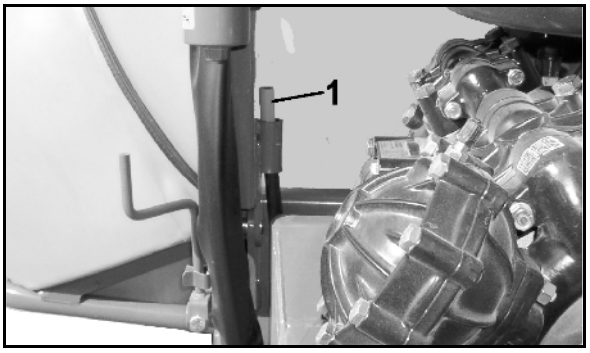


Fig. 51

5.14 Mechanic stand

UX with steering drawbar:

Risk of collision between the raised stand and Maintenance platform.

Unplug the lower hole on the raised stand.

- Stand raised during use or transportation (Fig. 52).
- Stand lowered (Fig. 53) when machine is uncoupled.

To use the stand:

1. Loosen linchpin (Fig. 52/2).
2. Pull out pin (Fig. 52/3).
3. Raise/lower stand using handle (Fig. 52/4).
4. Reinsert the pin into the stand and secure with the linchpin.
5. Using the manual crank (Fig. 52/5), continue to raise/lower the stand.

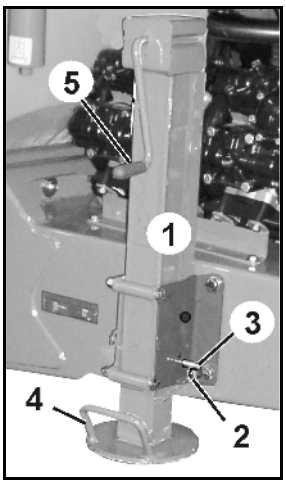


Fig. 52

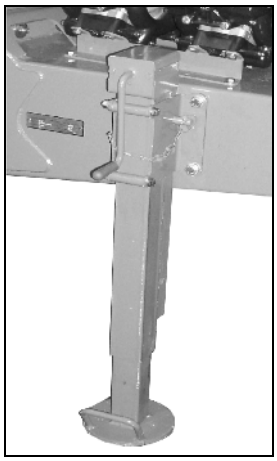


Fig. 53

5.15 Spray liquid tank

The spray liquid tank is filled via

- the filling opening,
- the suction hose (optional) on the suction port,
- the pressure filling connection (optional)

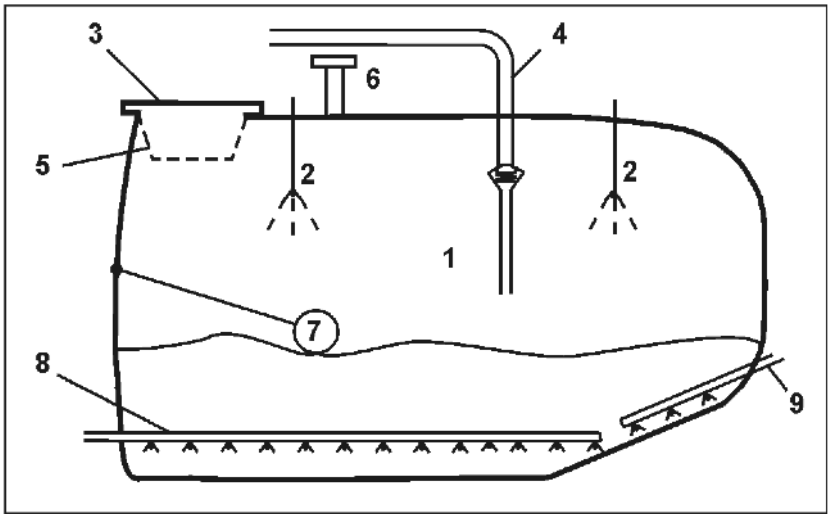


Fig. 54

(1) Spray liquid tank
(2) Internal cleaning
(3) Hinged/screw lid for filling opening
(4) External filling connection
(5) Filling sieve
(6) Ventilation
(7) Float for determining the fill level
(8) Agitator
(9) Additional agitator

When using the machine, parts of the framework may chafe the spray liquid tank. This does not affect the durability of the spray liquid tank.

Hinged/screw lid for the filling opening

- To open the lid, rotate to the left and swing open.
- To close the lid, fold down and rotate to the right until tight.

5.15.1 Fill level indicator on the machine

The fill level indicator shows the tank capacity [l] in the spray liquid tank

The fill level on the machine is shown

- electronically (Fig. 87/1) (optional)
- mechanically (Fig. 87/2)

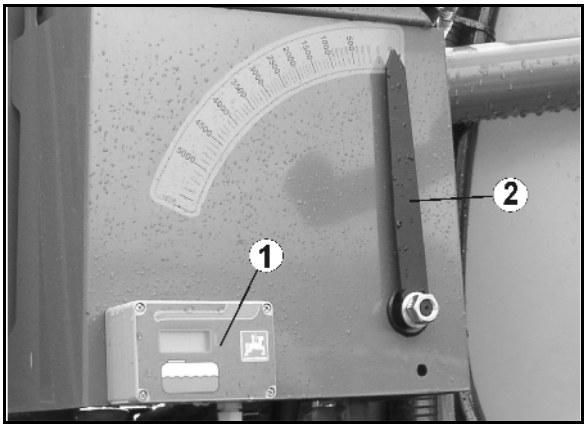


Fig. 55

5.15.2 Agitators

The field sprayer has a main agitator and an additional agitator. Both agitators are designed as hydraulic agitators. The additional agitator is also combined with pressure filter rinsing for the self cleaning pressure filter.

The main agitator has its own agitator pump. The additional agitator is supplied by the operation pump.

When the agitators are switched on, they mix the spray liquid in the spray liquid tank, thereby providing a homogeneous spray liquid. The stirring performance can be infinitely adjusted.

The stirring performance is adjusted

- using switch tap **H** for the main agitator on the setting tap.
- using switch tap **I** for the additional agitator on the setting tap.

To switch off the relevant agitator, turn the setting tap to position **0**.

The fastest stirring performance is available in position **1**.

Safety device for drainage function on the pressure filter (Fig. 56/2).

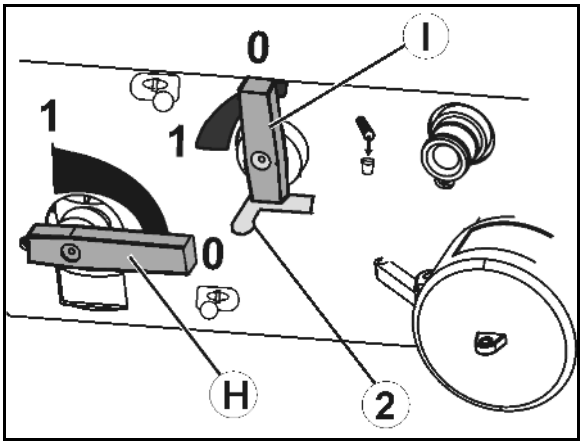


Fig. 56

5.15.3 Maintenance platform with ladder

Maintenance platform with swivel-down ladder for reaching the filling dome.

DANGER

- **Risk of injury from poisonous vapours.**

  Never climb into the spray liquid tank.

- **Riding on the machine creates a risk of falling.**

  Riding on the field sprayer is prohibited.

You MUST ensure that the ladder is locked in transport position.

Fig. 57/...

(1) Folded up ladder secured in transport position.

(2) Automatic catch

To unlock the automatic catch, lift the lever up.

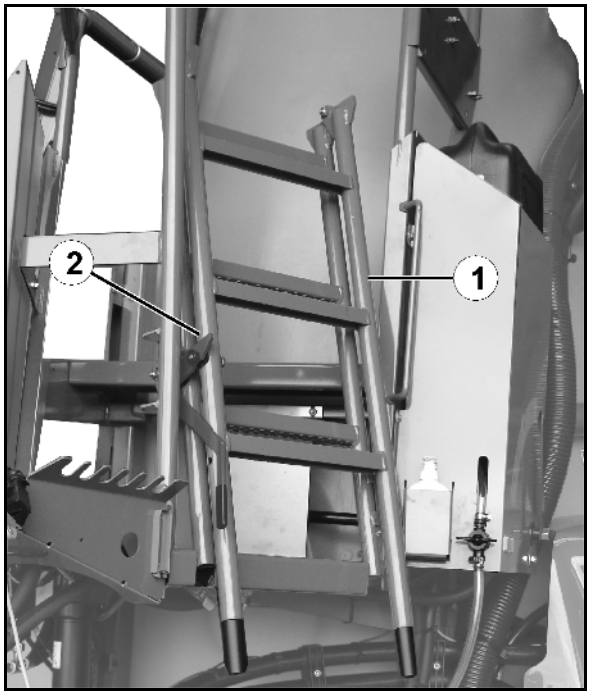


Fig. 57

5.15.4 Suction port for filling the spray liquid tank (optional)

Fig. 58/...

(1) Suction hose (8 m, 3").

(2) Quick coupling.

(3) Suction filter for filtering the intake water.

(4) Non-return valve. Prevents liquid already in the spray liquid tank from running out if the vacuum suddenly collapses during the filling process.

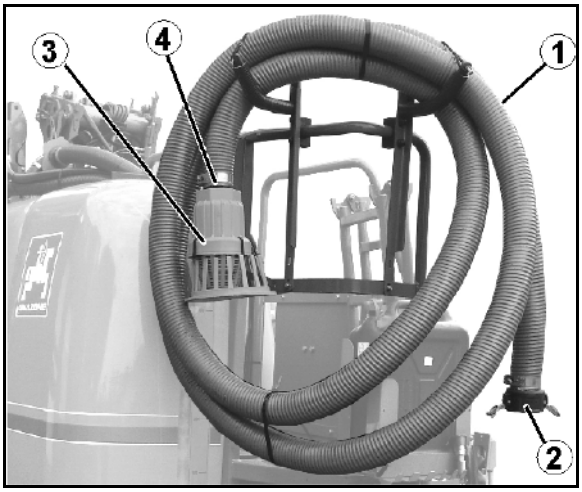


Fig. 58

5.15.5 Filling connection for filling the spray liquid tank with pressure (option)

- Filling with free flow path and swivel spout (Fig. 59).
- Return flow safe direct filling, not approved for filling from a public water supply network.

Fig. 59

- Switch tap with filling connection (Fig. 60).

(5) Automatic fill stop with button for manual termination of the filling (optional)

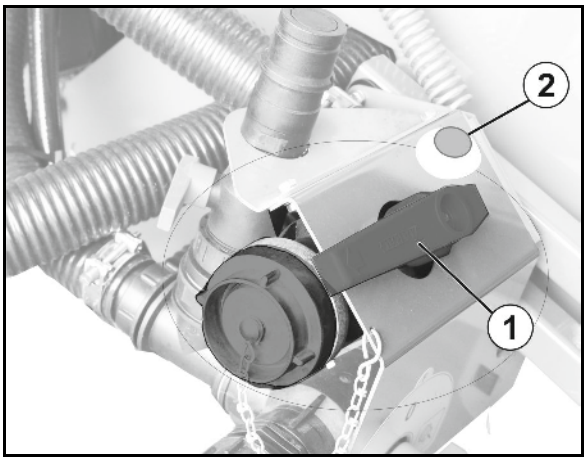


Fig. 60

5.16 Flushing water tank

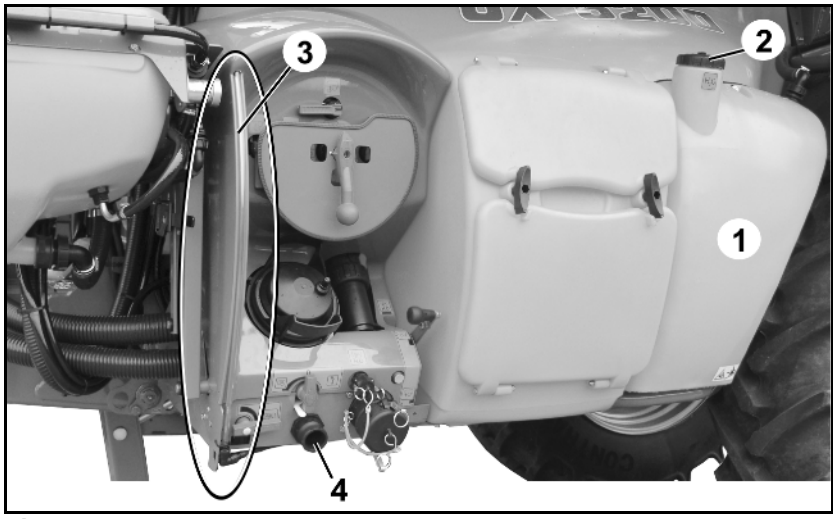


Fig. 61

UX3200 : one flushing water tank (320 l capacity)

UX4200/5200/6200 : two connected flushing water tanks. (550 l total capacity).

Fig. 61**,** Fig. 62/…

(1) Flushing water tank

(2) Screw lid with ventilation

(3) Fill level indicator

(4) Filling connection

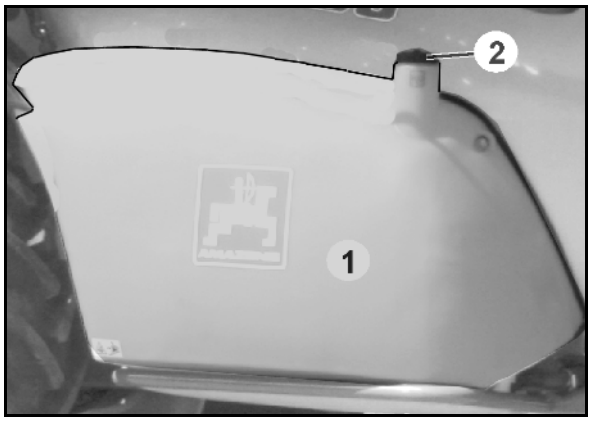


Fig. 62

Clear water is also fed into the flushing water tank. The water serves to

- thin the residue in the spray liquid tank at the end of spraying operation.
- clean (flush) the whole field sprayer in the field.
- clean the suction chest and the spray lines when the tank is full.

Only fill the flushing water tank with clear fresh water.

Filling the flushing water tank:

1. Connect filling hose.
2. Fill the flushing water tank via the filling connection (observe fill level display).
3. Fit the stopper cap on the filling connection.

Fit the stopper cap on the filling connection, otherwise air will be drawn in via the filling connection when flushing water is drawn in!

5.17 Induction bowl with canister flushing

Fig. 63/...

(1) Swivel-out induction bowl for receiving, dissolving and drawing in crop protection agents and urea.
(2) Hinged lid.
(3) Handle for swivelling the induction bowl.
(4) Spray gun.
(5) Hinged lid catch
(F) Switch tap for ring line / canister flushing.

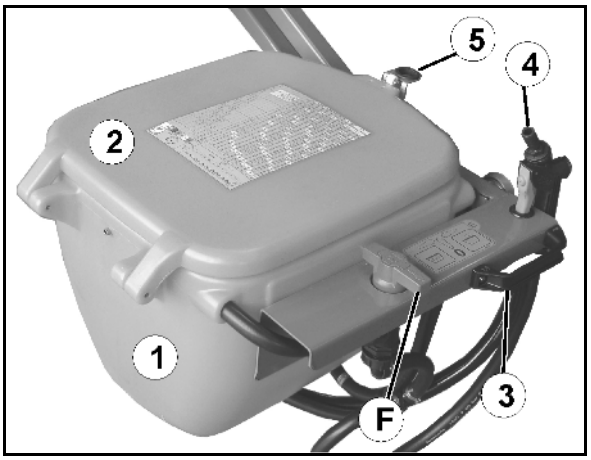


Fig. 63

Fig. 64/...

Induction bowl with transport safety catch for preventing the induction bowl from being swivelled down while in transport position.

To swivel the induction bowl in filling position:

1. Take hold of the handle on the induction bowl.
2. Unlock transport safety catch (Fig. 64/1).
3. Swivel the induction bowl down.

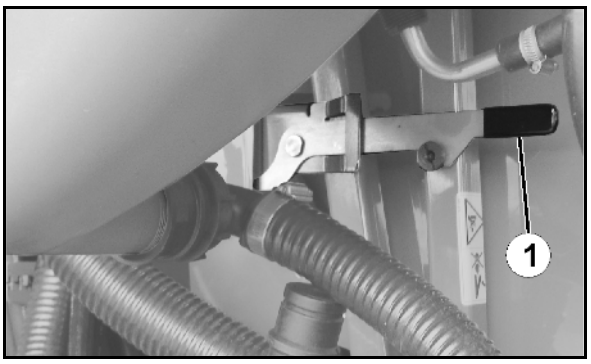


Fig. 64

Fig. 65/...

(1) The bottom sieve in the induction bowl prevents lumps and foreign objects from being drawn in.
(2) Rotating canister flushing nozzle for washing out canisters or other containers.
(3) Pressure plate.
(4) Ring line to dissolve and induct crop protection agent and urea.
(5) Scale

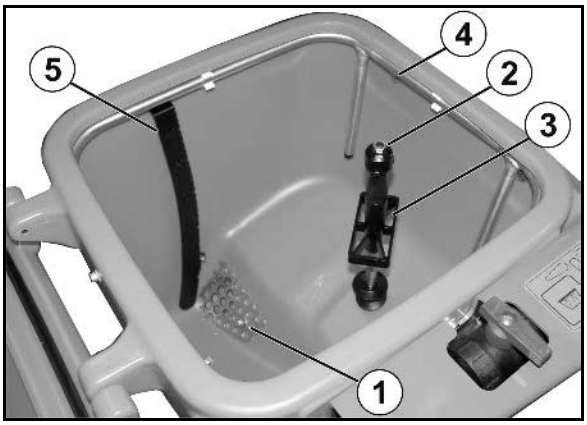


Fig. 65

Water escapes from the canister flushing nozzle if

- the pressure plate is pressed downwards.
- the closed hinged lid presses the canister flushing nozzle downwards (Fig. 66).

WARNING

Close the hinged lid before rinsing the induction bowl.

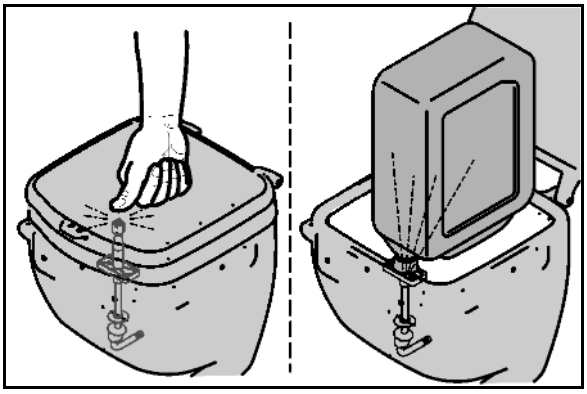


Fig. 66

Spray gun for flushing the induction bowl

The spray gun is used for flushing the induction bowl with flushing water during or after the flushing process.

Secure the spray gun against unintentional spraying using the locking mechanism (Fig. 67/1)

- before each pause in spraying.
- before depositing the spray gun in its holder after cleaning work is complete.

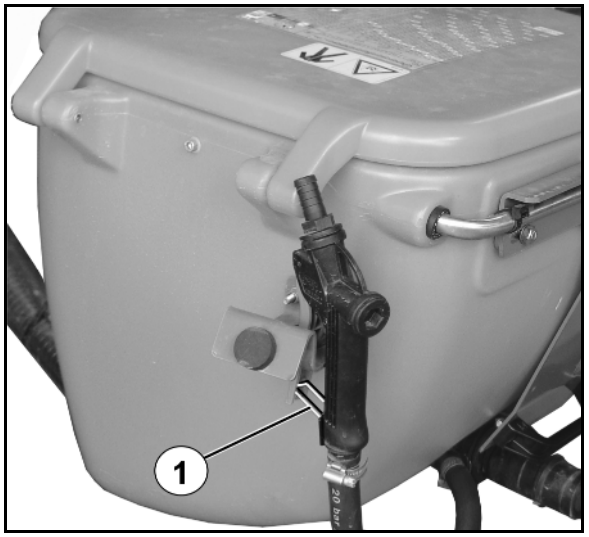


Fig. 67

5.18 Filling connection for Ecofill (optional)

Ecofill connection for extracting spraying agent from Ecofill tanks.

Fig. 68/…

(1) Ecofill filling connection (optional).

(2) Flushing port for Ecofill counter.

(O) Ecofill switch tap

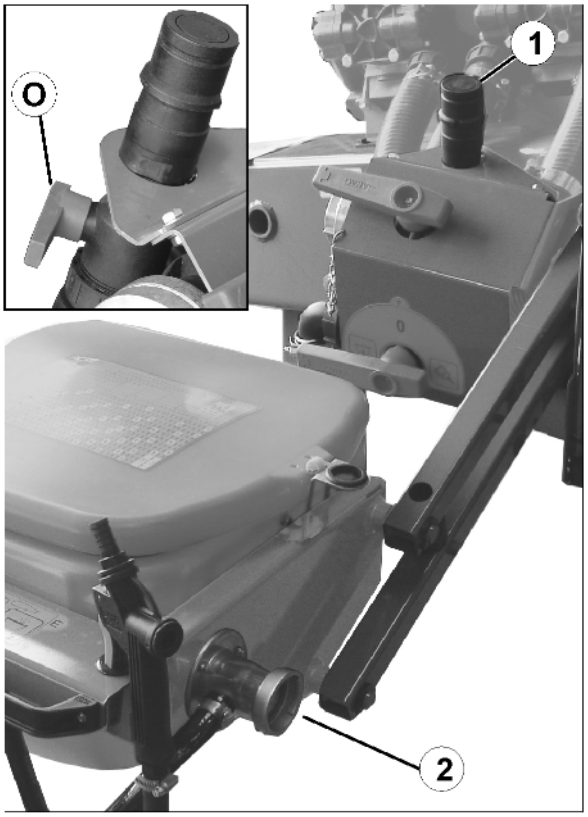


Fig. 68

5.19 Fresh water tank

Fig. 69/…

(1) Fresh water holdertank capacity: 20l)

(2) Hose

(3) Drain tap for clear fresh water

- o for cleaning hands or
- o for cleaning the spraying nozzles.

(4) Soap dispenser

WARNING

Danger of poisoning from using unclean water in the fresh water tank.

Never use the water from the fresh water tank as drinking water. The materials used to construct the fresh water tank are not food-safe.

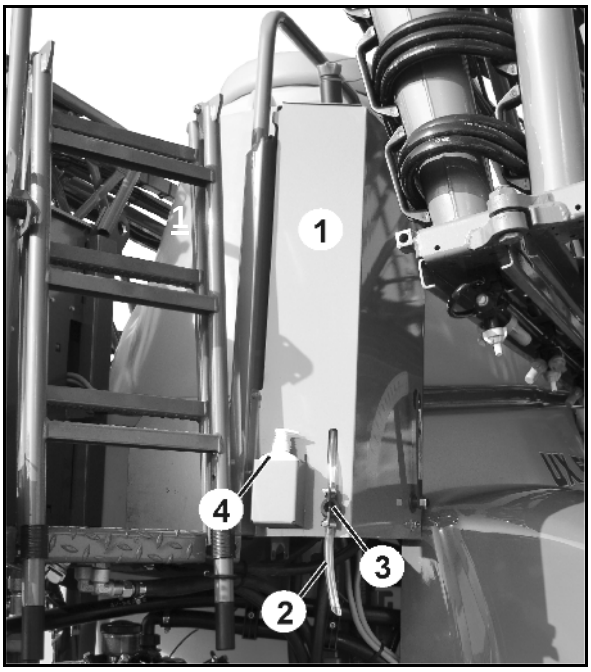


Fig. 69

WARNING

Inadmissible contamination of the clear water tank with crop protection agent or spray liquid!

Always fill the clear water tank with clear freshwater only, and never with crop protection agent or spray liquid.

When using the field sprayer, make sure that there is always an adequate supply of clear freshwater. Check and also fill the freshwater tank when you fill the spray liquid tank.

5.20 Hydropneumatic sprung suspension (optional)

The hydropneumatic sprung suspension contains an automatic level regulation device independent of the load status.

In manual mode, the machine can be lowered

- to reduce the overhead clearance,
- to switch off the sprung suspension.

Fig. 70/...

(1) Hydraulic cylinder

(2) Pressure accumulator

(3) Axle holder

See operating manual for software ISOBUS

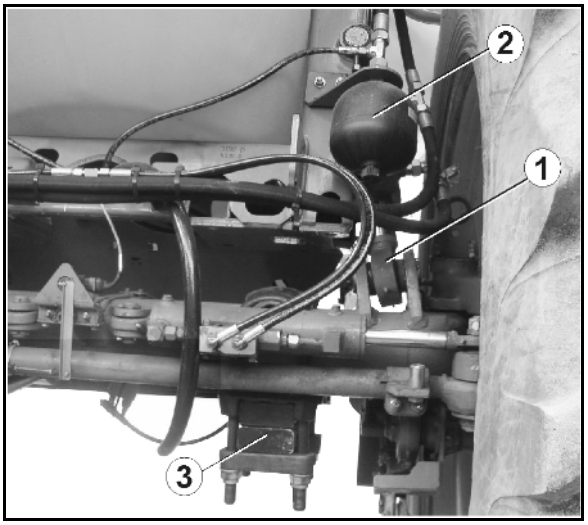


Fig. 70

5.21 Pump equipment

All components that come into direct contact with crop protection agents are produced from die-cast aluminium with a plastic coating, or from plastic. Based on the current state of knowledge, these pumps are suitable for spreading standard crop protection agents and liquid fertilisers.

Never exceed the maximum permissible pump drive speed of 540 1/min!

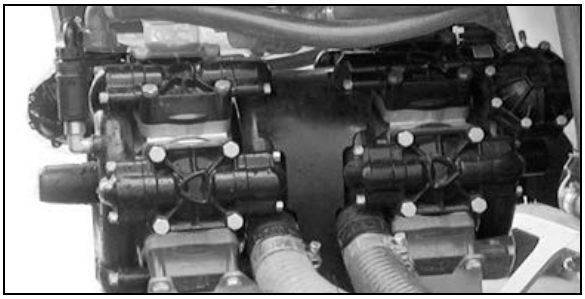


Fig. 71

Technical data: pump equipment

Type UX			3200/4200		4200 / 5200/6200
Pump equipment			AR 185	AR 280	2 x AR 280
Delivery capacity at nominal speed	[l/min]	at 0 bar	160	260	2 x 260
		at 10 bar	155	245	2 x 245
Power requirement	[kW]		4,6	6,9	2 x 6,9
Construction type			4-cylinder piston diaphragm pump	6-cylinder piston diaphragm pump	6-cylinder piston diaphragm pump
Pulsation damping			Pressure reservoir		

The pumps are driven

- directly by the PTO shaft (hitch drawbar).

→ Drive speed 540 rpm

- via a belt drive from the PTO shaft (straight drawbar).

→ Drive speed 540 rpm.

- directly from a hydraulic motor.

→ Drive speed 540 rpm

5.21.1 Hydraulic pump drive

- The maximum pump speed is hydraulically limited to 540 rpm.
- For low pump speeds, reduce the oil flow from the tractor side.
- The pump speed is displayed on the control terminal.

5.22 Filter equipment

- Use all the filters provided with the filter equipment. Clean the filters regularly (refer to the "Cleaning" section, page 188). Fault-free field sprayer operation can only be achieved by correct filtering of the spray liquid. Correct filtering has a significant effect on the success of the crop protection measures.
- Pay attention to the permissible combinations of filters and mesh sizes. The mesh sizes for the self cleaning pressure filter and the nozzle filters must always be smaller than the nozzle opening of the nozzles in question.
- Ensure that the use of pressure filter inserts with 80 or 100 mesh/inch for some crop protection agents can filter out active agents. In individual cases, enquire with crop protection agent manufacturers.

5.22.1 Filling sieve

The filling sieve prevents the spray liquid from becoming contaminated while filling the spray liquid tank via the filling dome.

Mesh size: 1.00 mm

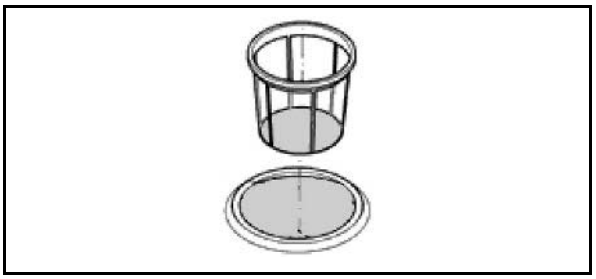


Fig. 72

5.22.2 Suction filter

The suction filter (Fig. 73/1) filters

- the spray liquid during the spraying operation.
- the water when filling the spray liquid tank via the suction hose.

Mesh size: 0.60 mm

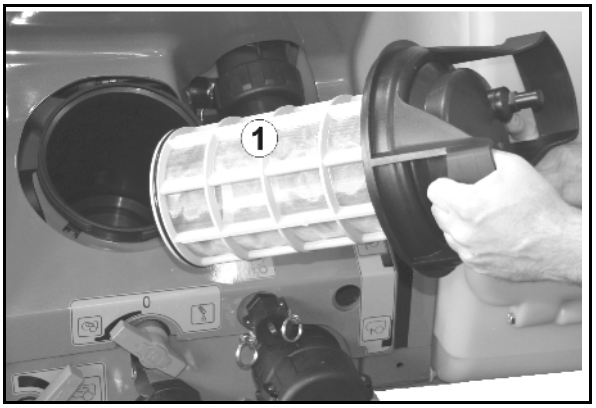


Fig. 73

5.22.3 Self cleaning pressure filter

The self cleaning pressure filter (Fig. 74/1)

- prevents the nozzle filter upstream of the spraying nozzle from becoming blocked.
- has a greater mesh count/inch than the suction filter.

With the additional agitator switched on, the inside surface of the pressure filter insert is constantly rinsed through, and undissolved particles of spraying agent and dirt are conveyed back into the spray liquid tank.

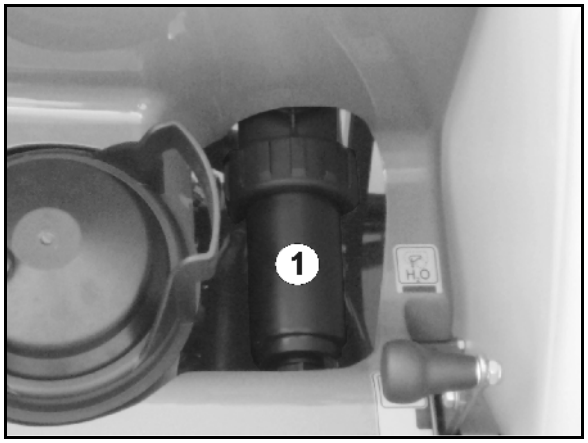


Fig. 74

Overview of the pressure filter inserts

- 50 mesh/inch (standard), blue
  for nozzle size '03' and larger
  Filter area: 216 mm²
  Mesh size: 0.35 mm
- 80 mesh/inch, yellow
  for nozzle size '02'
  Filter area: 216 mm²
  Mesh size: 0.20 mm
- 100 mesh/inch green
  for nozzle size '015' and smaller
  Filter area: 216 mm²
  Mesh size: 0.15 mm

5.22.4 Nozzle filters

The nozzle filters (Fig. 75/1) prevent the spraying nozzle from becoming blocked.

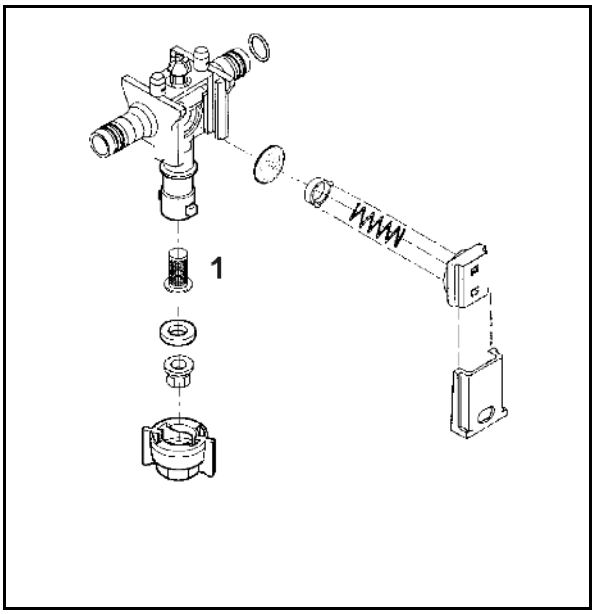


Fig. 75

Overview of the nozzle filters

- 24 mesh/inch,
  for nozzle size '06' and larger
  Filter area: 5.00 mm²
  Mesh size: 0.50 mm
- 50 mesh/inch (standard),
  for nozzle size '02' to '05'
  Filter area: 5.07 mm²
  Mesh size: 0.35 mm
- 100 mesh/inch,
  for nozzle size '015' and smaller
  Filter area: 5.07 mm²
  Mesh size: 0.15 mm

5.22.5 Bottom sieve in the induction bowl

The bottom sieve (Fig. 76/1) in the induction bowl prevents lumps and foreign bodies from being drawn in.

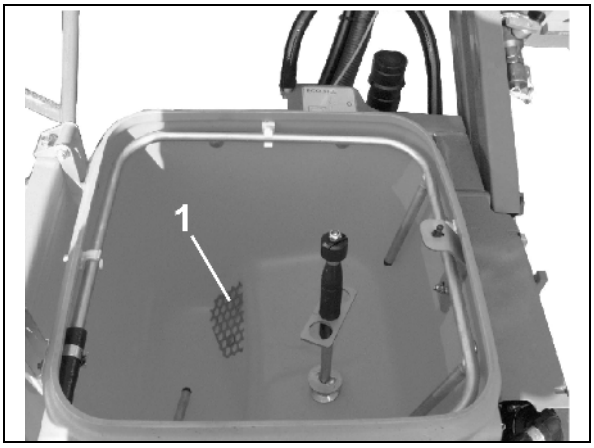


Fig. 76

5.23 Drawbar (optional)

The automatic drawbar serves to pull the braked trailers

- with a permissible total weight of 12000 kg and pneumatic brake.
- with a permissible total weight of 8000 kg and overrun brake.
- with a total weight which is lower than the permitted total weight of the field sprayer.
- without drawbar load.
- with towing eye 40 DIN 74054.

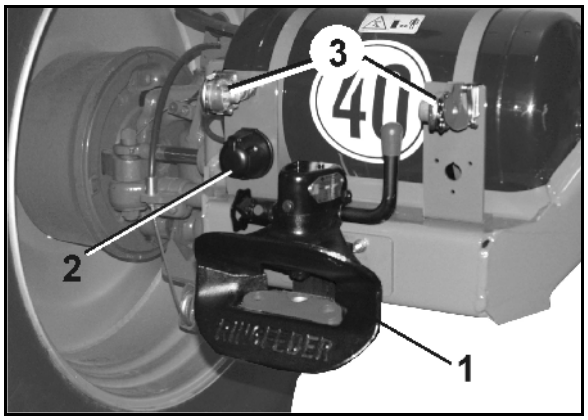


Fig. 77

Fig. 77/...

(1) Drawbar

(2) Connection for lighting

(3) Connection for brake

To unlock the drawbar, pull the rotary knob (Fig. 78/1) and turn until it engages in the upper groove (Fig. 78/2) Then raise the lever (Fig. 78/3) until the pin disengages.

The drawbar of the trailer must be long enough to prevent collisions with the boom when driving in curves.

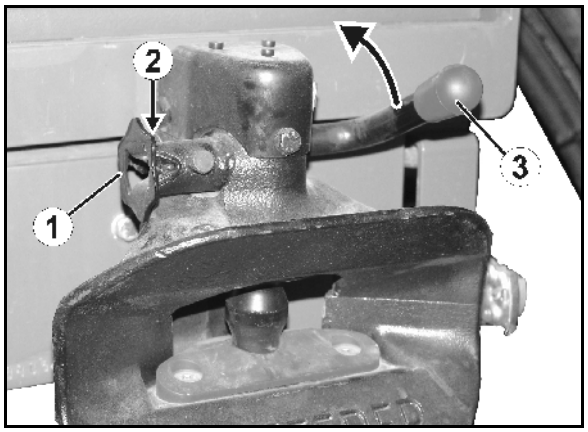


Fig. 78

WARNING

Risk of crushing when coupling the machine and standing between the machine and the trailer!

Instruct people to leave the danger area between the machine and the trailer before you approach the trailer.

Coupling the trailer via the automatic drawbar is a one-man operation.

Helpers as guides are not necessary.

WARNING

When coupling and uncoupling trailers, follow the safety instructions in the section Coupling and uncoupling the machine, see page 148**.**

5.24 Transport and secure container (optional)

Transport and secure container (Fig. 79/1) for storing protective clothing and accessories.

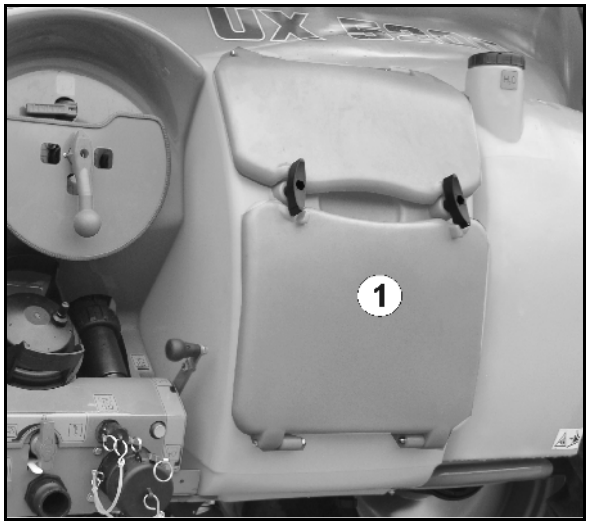


Fig. 79

5.25 Exterior wash down kit (optional)

Fig. 80/…

Exterior wash down kit for cleaning the field sprayer, includes

(1) Hose coiler,

(2) 20 m pressure hose,

(3) Spray gun

Operating pressure: 10 bar

Water output: 18 l/min

WARNING

Danger from liquids escaping under pressure and contamination with spray liquid if the spray gun is activated accidentally.

Secure the spray gun against unintentional spraying using the locking mechanism (Fig. 81/1)

- before each pause in spraying.
- before depositing the spray gun in its holder after cleaning work is complete.

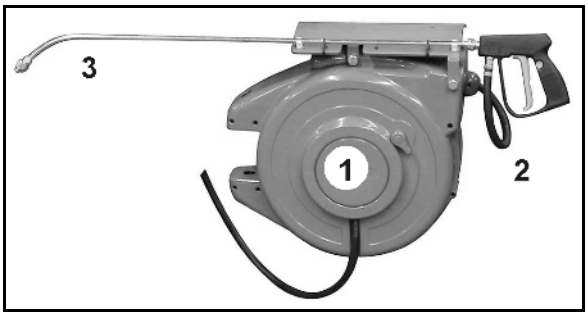


Fig. 80

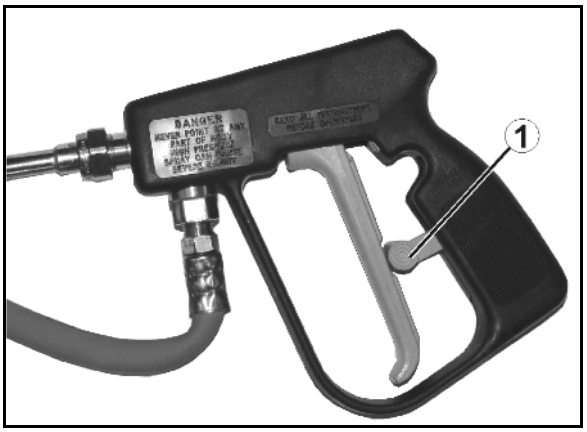


Fig. 81

5.26 Camera (optional)

The implement can be equipped with (Fig. 82/1 and Fig. 83/1) a camera.

Features:

- Viewing angle of 135°
- Heater and lotus coating
- Infrared night-view technology
- Automatic backlight compensation

Super-S-boom

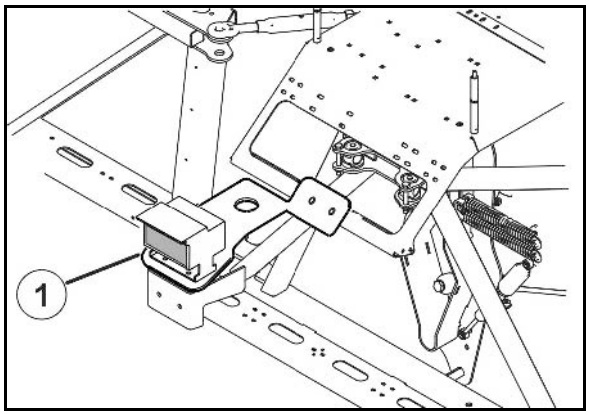


Fig. 82

Super-L-boom

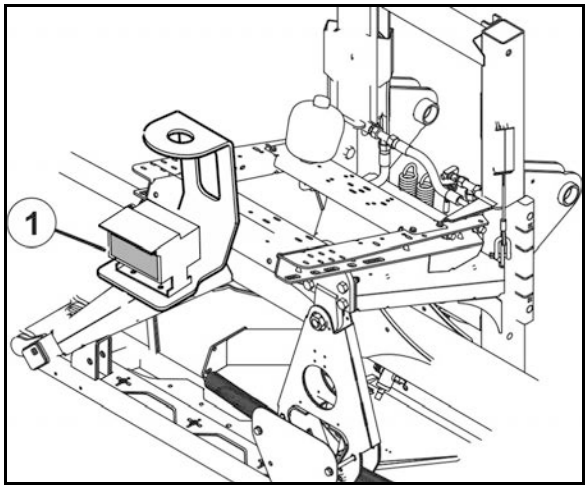


Fig. 83

5.27 Work floodlights

2 work floodlights on the sprayer boom and 2 work floodlights on the platform.

Fig. 84

LED individual nozzle illumination:

Fig. 85

2 variants:

- Separate power supply from the tractor is required, operation via the dashboard.
- Power supply and operation via ISOBUS.

5.28 Comfort equipment

Comfort equipment for implements with control terminal.

Comfort equipment functions:

- **Cleaning – remote-controlled residue dilution and internal cleaning when interrupting or stopping spraying, without leaving the tractor.**
  - Remote-controlled changing from spraying position (Fig. 86/A) to flushing position (Fig. 86/B).
  - Cut-off of main and additional agitator.
  - Remote-controlled switching on and off of internal cleaning.
- **Automatic agitator – remote-controlled operation and regulation of the agitating intensity.**
  - Automatic fill-level dependent regulation of the main agitator (agitator tap missing from control terminal).
  - Automatic agitator cut-off if fill level drops below 200 litres.
  - Manual setting of the agitating intensity on the control terminal.
- **Filling stop when filling via suction port.**
  - Filling stopped automatically when the desired fill level is reached.
  - Filling stopped manually.

    Changeover from filling position (Fig. 86/C) to spraying position (Fig. 86/A) via the control terminal or on the control panel (Fig. 86/1).

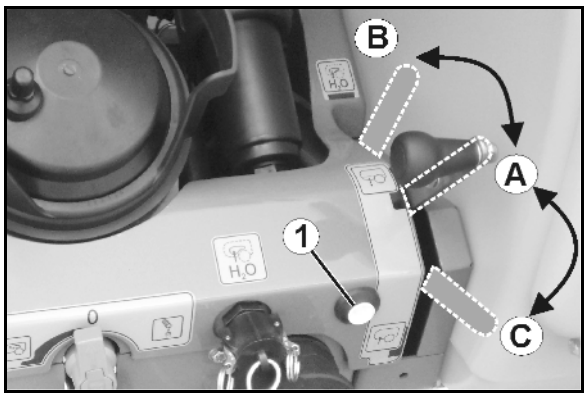


Fig. 86

Use the button to switch over the suction port

- from spraying to flushing, the control terminal has to be in the work menu,
- from filling to spraying, the control terminal has to be in the filling menu.

See operating manual for software ISOBUS!

5.29 Control terminal

The following are performed via the control terminal:

- input of implement-specific data.
- input of job-related data.
- control of the field sprayer to change the spray rate used in spraying operation.
- the operation of all functions on the sprayer boom.
- the operation of special functions.
- the monitoring of the field sprayer during spraying operation.

The control terminal controls a job computer. Here, the job computer receives all necessary information and manages the area-based regulation of the spray rate [l/ha] depending on the quantity (target quantity) entered and the current operational speed [km/h].

Fig. 87

See operating manual for software ISOBUS.

5.30 AMASPRAY+

The **AMASPRAY+** can be used on the field sprayer as a fully automatic control device. The device carries out area-based regulation of the spread rate, depending on the current speed and working width.

Current spread rate, speed, worked area, total area, quantity applied and overall spread rate, working time and distance travelled are continuously detected.

See also AMASPRAY+ operating manual.

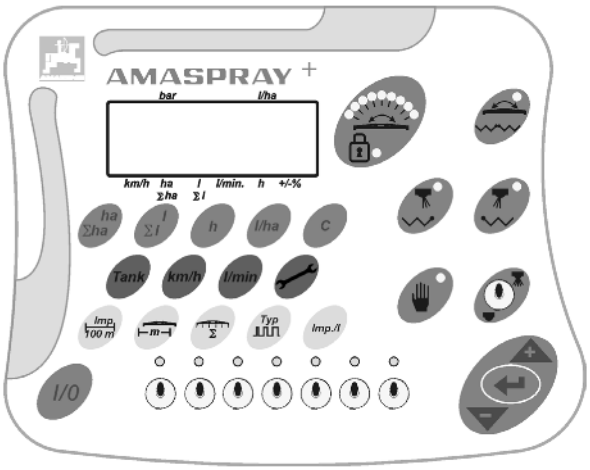


Fig. 88

6 Construction and function of the sprayer boom

The proper condition of the sprayer boom and how it is suspended have considerable influence on the distribution accuracy of the spray liquid. With the spraying height of the sprayer boom to the crop set correctly, a complete overlap is achieved. Nozzles are attached to the boom at intervals of 50 cm.

Profi-folding:

The boom is operated via the control terminal

→ During use, locate tractor control unit *red*.

See operating manual for software ISOBUS!

Profi-folding consists of the following functions:

- Folding the sprayer boom in and out,
- Hydraulic height adjustment,
- Hydraulic tilt adjustment,
- Folding in one side of the sprayer boom
- One-sided, independent raising and lowering of the sprayer boom / boom extension (Profi-folding II only).

Folding via the tractor control unit

The boom is operated via tractor control units.

- Depending on equipment, sprayer boom folding must be selected using the control terminal and carried out using tractor control unit *green* (preselected folding).

  See operating manual for software ISOBUS.
- Height adjustment is controlled via tractor control unit *green*.

Adjust spraying height

WARNING

Risk of crushing and impact for personnel who are caught while the height of the sprayer boom is being raised or lowered.

Direct people out of the danger area of the machine before raising or lowering the sprayer boom using height adjustment.

1. Direct people out of the danger area of the machine.
2. Set spraying height as per spray table via

- Actuate tractor control unit *yellow*.
- Control terminal (with Profi-folding).

Always align the sprayer boom parallel to the ground; only then can the specified spraying height be achieved on all nozzles.

Folding out and in

CAUTION

It is prohibited to fold the sprayer boom in and out during travel.

DANGER

Always maintain an adequate distance from overhead cables when folding the sprayer boom out and in. Contact with overhead cables may lead to fatal injuries.

WARNING

Risk of crushing the entire body and impact due to personnel becoming trapped by laterally-swivelling machine parts.

These dangers can cause extremely serious and potentially fatal injuries.

Maintain an adequate safety distance from moving machine parts while the tractor engine is running.

Ensure that all personnel maintain an adequate safety distance from moving machine parts.

Instruct personnel to leave the swivel range of any moving machine parts before swivelling the parts.

WARNING

Danger for third parties from crushing, being drawn in and/or caught by the moving parts of the boom or impact if they stand in the swivel range of the boom while it is folding out or in.

- Instruct personnel to leave the swivel range of the boom before you fold the boom out or in.
- Release the control for folding the boom out and in immediately if someone enters the swivel range.

The hydraulic cylinders for boom folding maintain their respective end positions (transport position and working position) in both the folded-in and folded-out boom state.

Swing compensation

The control terminal shows when swing compensation (Fig. 89/1) is locked.

Fig. 89/…

(1) Swing compensation unlocked.

(2) Swing compensation locked.

For illustration purposes, in this image the protective device has been removed from the swing compensation.

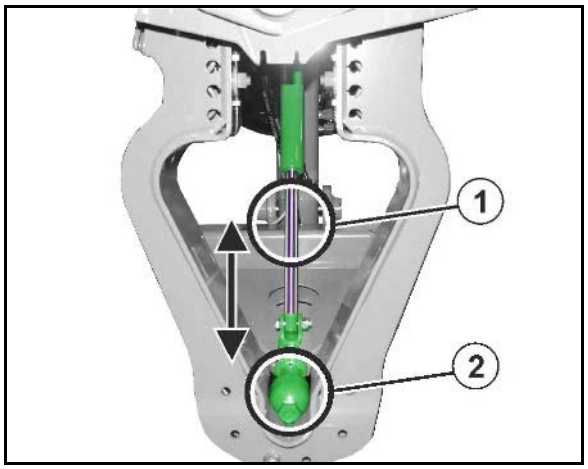


Fig. 89

Unlocking the swing compensation:

Even lateral distribution can only be achieved with the swing compensation unlocked.

After the sprayer boom is fully folded out, actuate the operating lever for another 5 seconds.

→ The swing compensation (Fig. 89/1) unlocks and the unfolded sprayer boom can swing free opposite the boom frame.

Locking the swing compensation:

- **For road transport**
- **When folding the boom out and in.**

Folding via the tractor control unit: the swing compensation locks automatically before the boom folds in.

Outer boom locking

The outer boom locking mechanisms protect the boom from damage if the outer boom sections come into contact with solid obstructions. The locking mechanism enables the outer boom section to avoid collision by moving around the articulated axle in and against the direction of travel; it is then automatically returned to its working position.

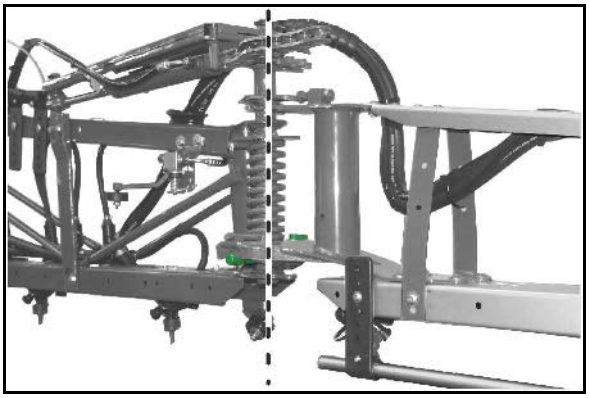


Fig. 90

6.1 Super-S boom

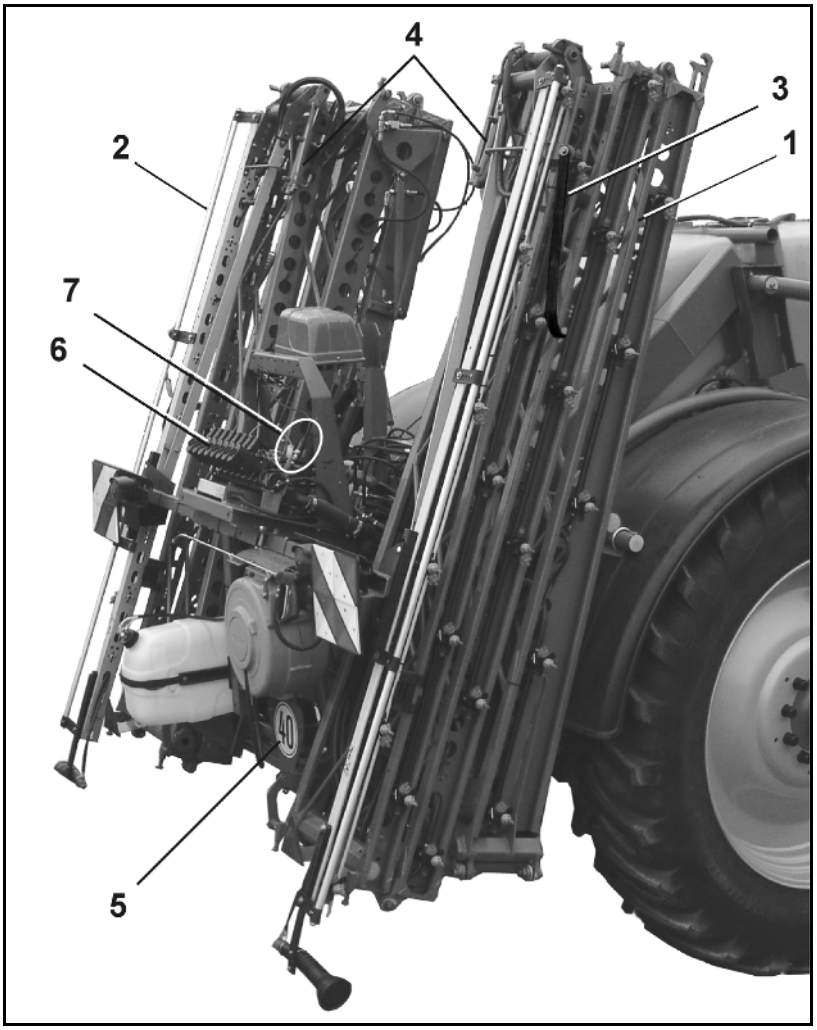


Fig. 91

Fig. 91/...

(1) Sprayer boom with spray lines (here: folded boom package).

(2) Nozzle protection tube

(3) Spacer

(4) Outer boom locking, see Seite 106

(5) Swing compensation, see page 105.

(6) Boom equipment

(7) Pressure sensor

Fig. 92/...

(1) Pressure connection for the spraying-pressure pressure gauge

(2) Flow meter for determining the spray rate [l/ha]

(3) Return flow meter for determining the spray liquid which has been fed back into the spray liquid tank

(4) Motor valves for switching the boom part width sections on and off

(5) Bypass valve

(6) Valve and switch tap for pressure circulating system (DUS)

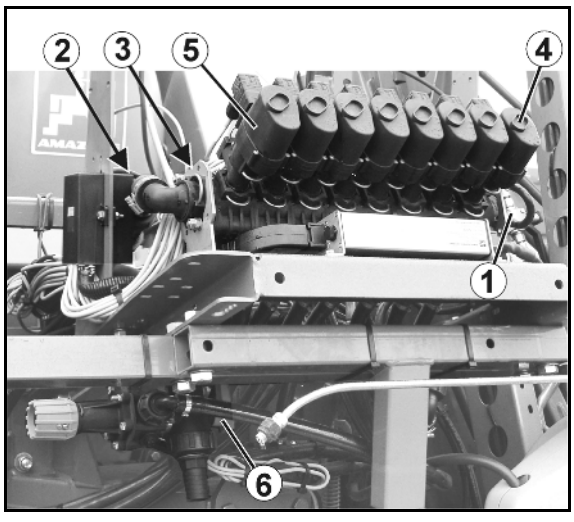


Fig. 92

6.1.1 Unlocking and locking the transport safety catch

WARNING

Risk of crushing and impact for other road users if the boom accidentally unfolds from the transport position during road transport.

Lock the folded boom package in the transport position using the transport safety catch before undertaking road transport.

Unlocking the transport safety catch

Raise the sprayer boom using height adjustment until the catching lugs (Fig. 93 /1) are released from the catching sockets (Fig. 93 /2).

→ The transport safety catch unlocks the sprayer boom from the transport position.

Fig. 93 shows the unlocked sprayer boom.

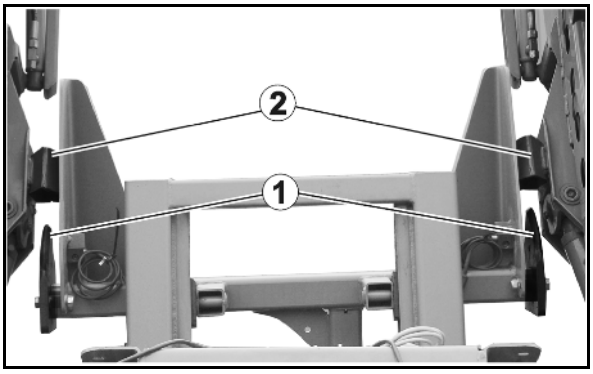


Fig. 93

Locking the transport safety catch

Lower the sprayer boom fully using height adjustment, until the catching lugs (Fig. 94 /1) grasp the catching sockets (Fig. 94/2).

→ The transport safety catch locks the sprayer boom in the transport position.

Fig. 94 shows the locked sprayer boom.

If the catching lugs (Fig. 94 /1) do not grasp the catching sockets (Fig. 94 /2), align the sprayer boom using tilt adjustment.

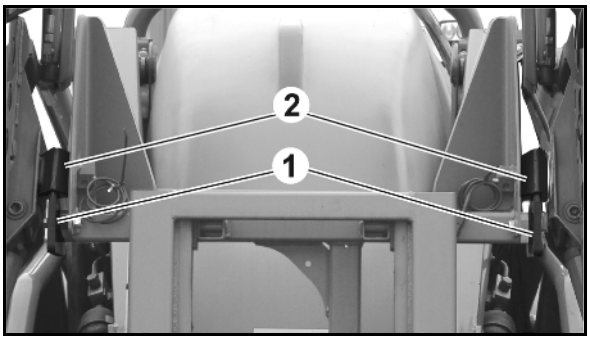


Fig. 94

6.1.2 Super-S boom, folding via the tractor control unit

Profi-folding: See operating manual for software ISOBUS.

Preselected folding: depending on the equipment, you must press the "fold sprayer boom" preselection button on the control terminal before activating tractor control unit *green*, in order to fold out the sprayer boom.

See separate AMASPRAY+ / Software ISOBUS operating manual.

Folding out the sprayer boom

1. Actuate tractor control unit *yellow*.

→ Raise the boom to unlock it from its transport position.

2. Actuate tractor control unit *green* until

→ both boom packages are folded down

→ the individual segments are fully folded out

→ and the swing compensation is unlocked.

- The appropriate hydraulic cylinders lock the boom in its working position.
- Folding out does not always happen symmetrically.

3. Actuate tractor control unit *yellow*

→ Set the spraying height for the sprayer boom.

Folding in the sprayer boom

1. Actuate tractor control unit *yellow*.

→ Raise the sprayer boom to a medium height

2. Set tilt adjustment to "0" (if present).
3. Actuate tractor control unit *green* until

→ the individual segments of the two booms are fully folded in.

→ the two boom packages are folded in.

4. Actuate tractor control unit *yellow*.

→ Lower the boom, locking it in the transport position.

CAUTION

Only drive in locked transport position.

The swing compensation locks automatically before the boom folds in.

6.2 Super-L boom

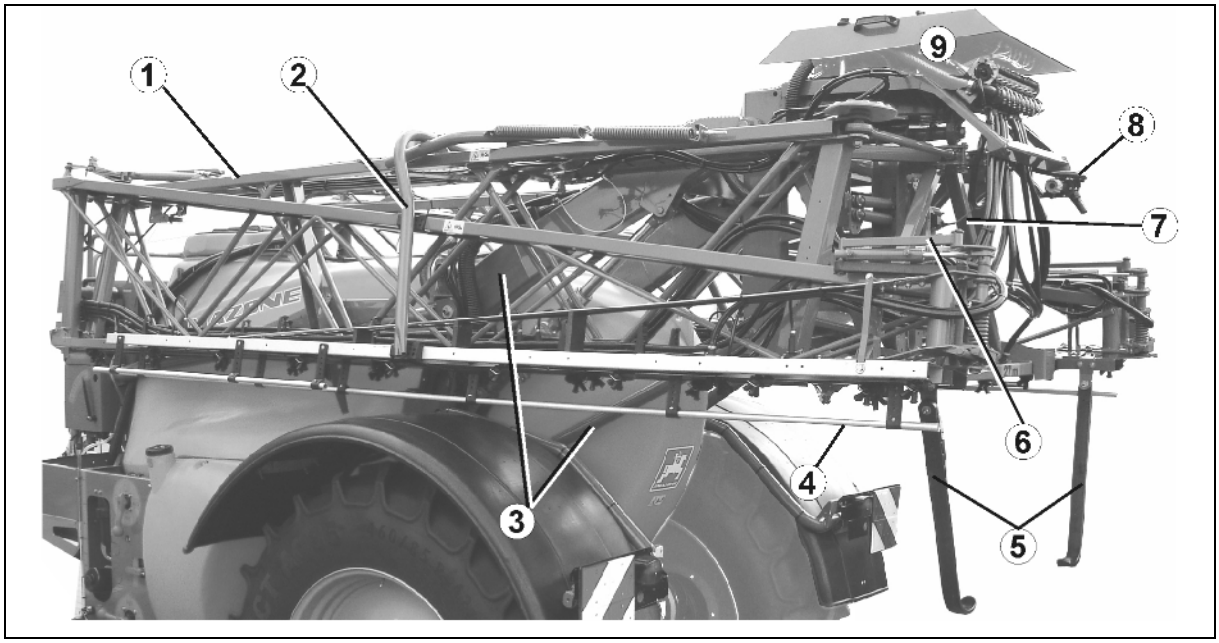


Fig. 95

Fig. 95/...

(1) Sprayer boom with spray lines

(2) Transport safety bow

(3) Parallelogram frame for adjusting the height of the sprayer boom

(4) Nozzle protection tube

(5) Spacer

(6) Outer boom locking, see Seite 106

(7) Swing compensation, see page 105

(8) Valve and switch tap for DUS system

(9) Boom equipment, see Fig. 96

Fig. 96/...

(1) Pressure connection for the spraying-pressure pressure gauge

(2) Flow meter for determining the spray rate [l/ha]

(3) Return flow meter for determining the spray liquid that has been fed back into the spray liquid tank (Control terminal only)

(4) Motor valves for switching the boom part width sections on and off

(5) Bypass valve

(6) Pressure relief

(7) Pressure sensor

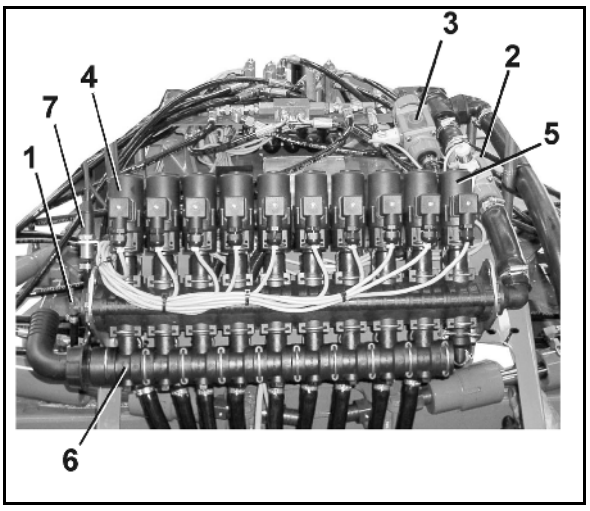


Fig. 96

Unlocking and locking the transport safety catch

WARNING

Risk of crushing and impact for other road users if the boom accidentally unfolds from the transport position during road transport.

Lock the folded boom package in the transport position using the transport safety catch before undertaking road transport.

The transport safety bows are for securing the folded sprayer boom against accidental unfolding while in transport position.

Unlocking the transport safety catch

Before unfolding the sprayer boom, swivel the transport safety bows upwards, thereby unlocking the sprayer boom (Fig. 97/A).

Locking the transport safety catch

After folding the sprayer boom, swivel the transport safety bows downwards, thereby locking the sprayer boom (Fig. 97/B).

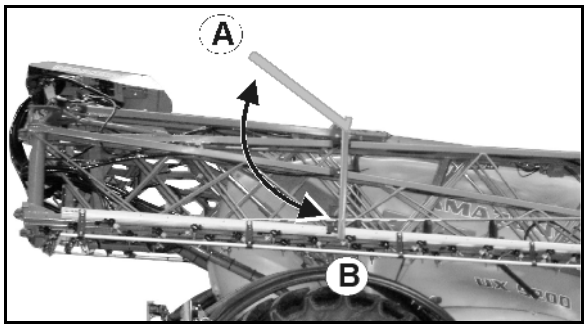


Fig. 97

6.2.1 Super-L boom, folded using tractor control unit

Profi-folding: See operating manual for software ISOBUS.

Preselected folding: depending on the equipment, you must press the "fold sprayer boom" preselection button on the control terminal before activating tractor control unit *green*, in order to fold out the sprayer boom.

See separate AMASPRAY+ / software ISOBUS operating manual.

Folding out the sprayer boom

1. Actuate tractor control unit *yellow*.

→ Lift boom out of the arrester hook.

2. Activate tractor control unit *green* until

→ the transport safety catch unlocks,

→ both boom packages are folded back,

→ the individual segments are fully unfolded,

→ and the swing compensation is unlocked.

- The appropriate hydraulic cylinders lock the boom in its working position.
- Folding out does not always happen symmetrically.

3. Actuate tractor control unit *green*

→ Set the spraying height for the sprayer boom.

Folding in the sprayer boom

1. Actuate tractor control unit *yellow*.

→ Lift sprayer boom to maximum height

2. Set tilt adjustment to "0" (if present).
3. Actuate tractor control unit *green* until

→ the individual segments are completely folded up

→ both boom packages are folded in

→ the transport catch secures the boom.

4. Actuate tractor control unit *yellow*.

→ Lower boom into the arrester hook.

CAUTION

Only drive in locked transport position.

The swing compensation locks automatically before the boom folds in.

6.3 Working with the sprayer boom folded out on one side

Working with the sprayer boom only folded out on one side is only permissible

- with the swing compensation locked.
- only if the other boom is folded down as a package from the transport position (Super S boom).
- briefly for passing obstacles (trees, electricity pylons, etc.).

- Lock the swing compensation before folding/unfolding the sprayer boom on one side.

  If the swing compensation is not locked, the sprayer boom may swing off to one side. If the unfolded boom extension strikes the ground, this can cause damage to the sprayer boom.
- Use a significantly reduced speed for spraying operation to avoid the sprayer boom swinging out and coming into contact with the ground with the swing compensation locked. Unless the sprayer boom is guided smoothly, even lateral distribution cannot be guaranteed.

The sprayer boom is fully unfolded.

1. Lock the swing compensation.
2. Using the height adjustment, lift the sprayer boom to a medium height.
3. Fold up the desired boom extension.

WARNING

Super-L boom:

After folding, the boom extension swivels forwards into the transport position.

→ Interrupt the folding process in good time for one-sided spraying.

WARNING

Super-S- boom:

Folded-in boom must remain in horizontal position!

After folding in, the boom lifts into the transport position.

→ Interrupt the folding process in good time for one-sided spraying.

4. Align the sprayer boom using tilt adjustment so it is parallel to the target surface.
5. Set the spraying height for the sprayer boom such that the sprayer boom is a minimum of 1 m off the ground.
6. Switch off the part width sections of the folded-in boom.
7. During spraying operation, drive at a significantly reduced speed.

6.4 Reduction joint on the outer boom (optional)

Using the reduction joint, the outer element of the outer boom can be folded manually to reduce the working width.

Case 1:

Number of nozzles outer part width section	=	Number of nozzles on the foldable outer element

→ When spraying with a reduced working width, keep the outer part width sections switched off.

Case 2:

Number of nozzles outer part width section	≠	Number of nozzles on the foldable outer element

→ Close the outer nozzles manually (triple nozzle head).

→ Perform changes on the control terminal.

- Enter the changed working width.
- Enter the changed number of nozzles on the outer part width sections.

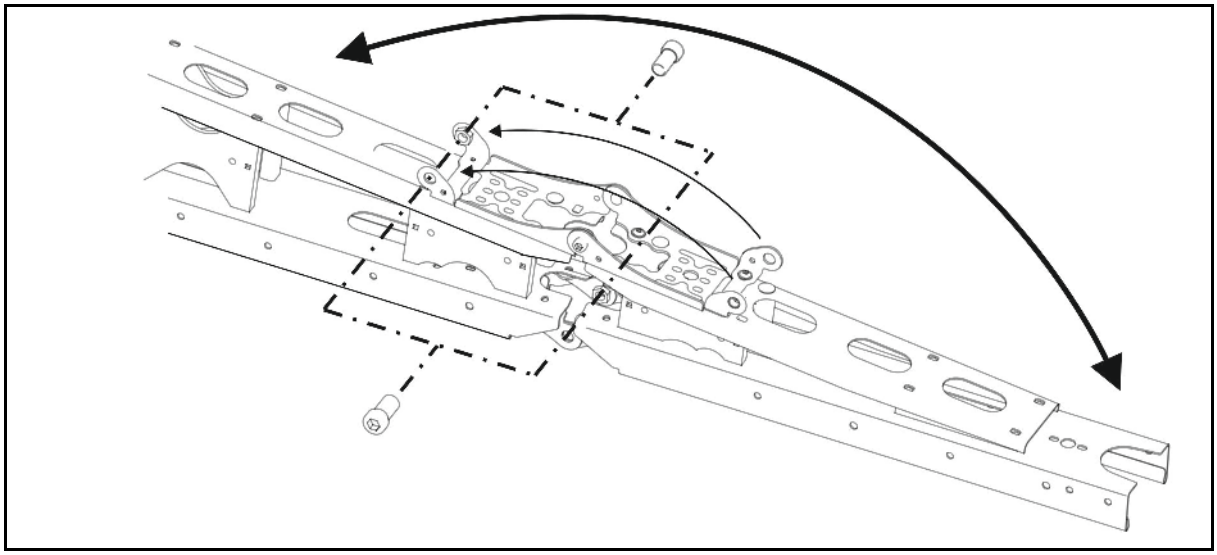


Fig. 98

2 bolts lock the folded and unfolded outer element in its respective end positions.

CAUTION
Before road transport, unfold the outer elements again so that the transport locking mechanism is active when the boom is folded.

6.5 Boom width reduction (option)

With the boom width reduction, one or two booms can remain folded in during operation depending on the version.

In addition, switch on the hydraulic accumulator (optional) as a collision protection.

The respective boom part width sections have to be activated in the on-board computer.

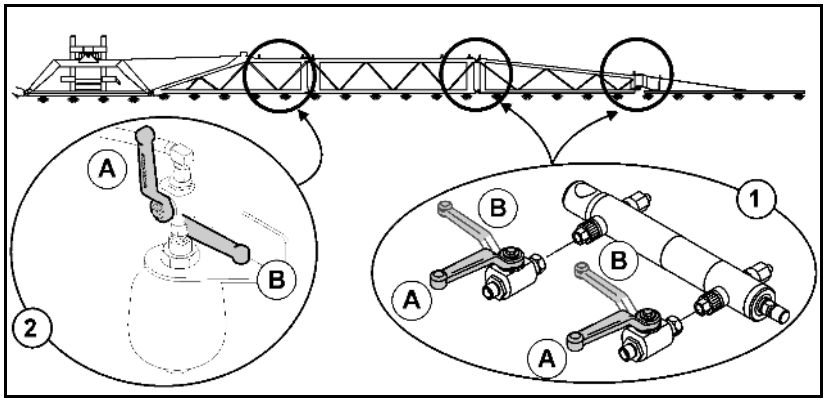


Fig. 99

(1) Boom width reduction

(2) Boom width damping (option)

(A) Stop tap opened

(B) Stop tap closed

Working with reduced working width

1. Reduce the boom width hydraulically.
2. Close the stop taps for the boom width reduction.
3. Open the stop tap for the boom damping.
4. Deactivate the respective boom part width sections in the on-board computer.
5. Perform work with reduced working width.

Close the stop tap for the boom damping.

- For road transport
- For use with full working width

Implements with DistanceControl plus:

With reduced working width, install each outer sensor rotated by 180° and disconnect the inner sensor.

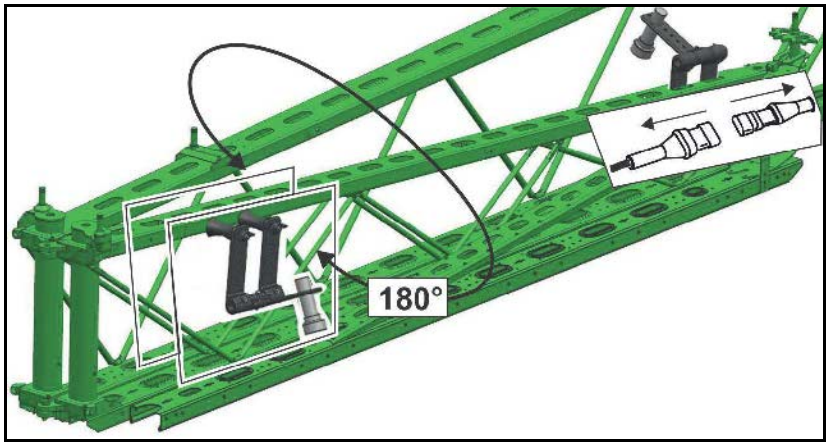


Fig. 100

6.6 Boom extension (option)

The boom extension increases the working width infinitely up to 1.20 metres.

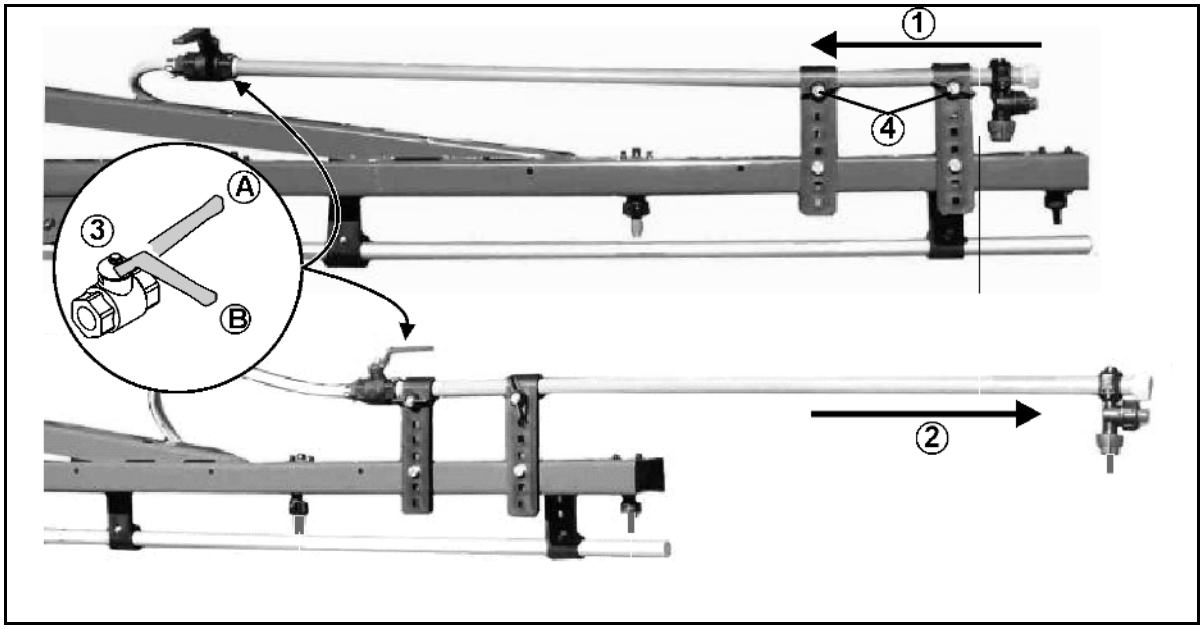


Fig. 101

(1) Boom extension in transport position

(2) Boom extension in working position

(3) Stop tap for the outer nozzle

(A) Stop tap opened

(B) Stop tap closed

(4) Wing bolts for securing the boom extension in the transport or working position

6.7 Hydraulic tilt adjustment (optional)

In unfavourable ground conditions, e.g. when there are ruts of variable depth or when driving with one side of the vehicle in a furrow, the sprayer boom can be aligned parallel to the ground or to the target surface using hydraulic tilt adjustment.

Adjust using:

- control terminal
- AMASPRAY+

See the operating manual for the control terminal.

6.8 Distance control (optional)

The Distance Control regulating unit for the sprayer boom automatically holds the sprayer boom parallel at the desired distance from the target surface.

- DistanceControl with 2 sensors
- DistanceControl with 4 sensors

Ultrasound sensors (Fig. 102/1) detect the distance to the ground or the crop. If the height deviates from the desired measurement on one side, the distance control regulates the tilt adjustment in order to adjust the height. If the terrain rises on both sides, the height adjustment raises the entire boom.

Switching off the sprayer boom on a headland will automatically raise the sprayer boom by approx. 50 cm. When switched back on again, the sprayer boom is lowered back to the calibrated height.

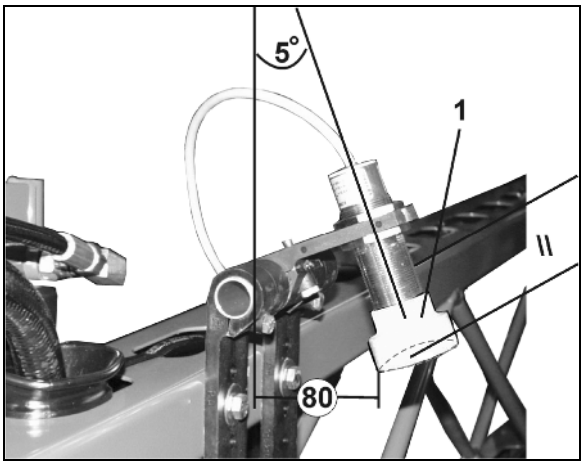


Fig. 102

See operating manual for software ISOBUS

- Setting the ultrasound sensors:

→ see Fig. 102

6.9 Spray lines and nozzles

The sprayer booms can be fitted with various spray lines. In turn, the spray lines can be fitted with single nozzles or multi nozzles, depending on the predominant conditions of use.

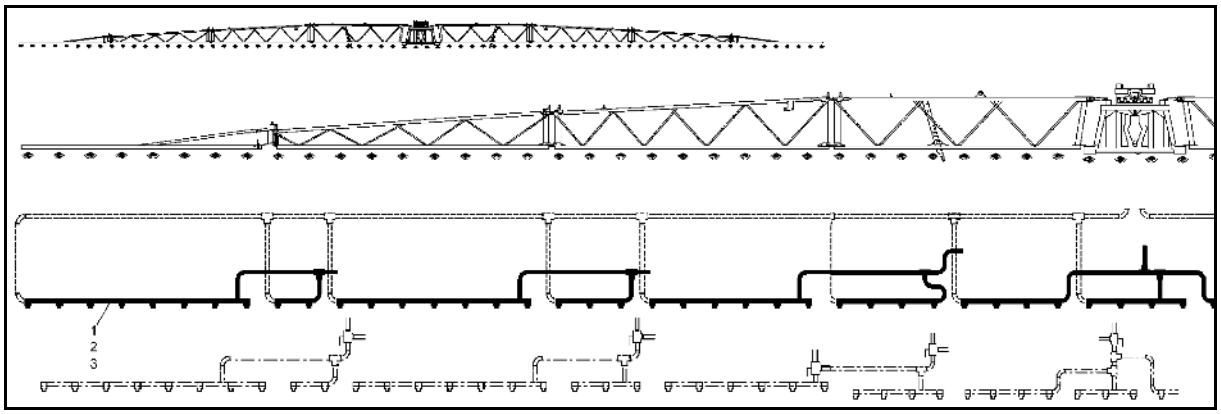


Fig. 103

6.9.1 Technical data

Ensure that the residue in the spray line is still being sprayed at an undiluted concentration. Always spray this residue on an untreated area. The residue contained in the spray line is dependent on the sprayer boom working width.

Formula for calculating the required distance in [m] for spraying out the undiluted residue in the spray line:

$$\text{Required distance [m]} = \frac{\text{Undiluted residue [l] x 10,000 [m}^2\text{/ha]}}{\text{Spray rate [l/ha] x working width [m]}}$$

Spray line **Super-S** sprayer boom with single nozzles or multi-nozzles

Working width	Number of part width sections	Number of nozzles per part width section	Residue	• dilutable	• not dilutable	• total	Residue in pressure circulating system (DUS)	• dilutable	• not dilutable	• total	Weight
[m]			[l]								[kg]
15	5	6-6-6-6-6		4,5	7,0	11,5		12,5	1,0	13,5	11,0
	7	3-5-5-4-5-5-3		4,5	7,5	12,0		13,0	1,0	14,0	12,0
16	5	7-6-6-6-7		4,5	7,5	12,0		13,0	1,0	14,0	12,0
18	5	6-8-8-8-6		4,5	8,0	12,5		13,5	1,0	14,5	13,0
	7	5-6-5-4-5-6-5		4,5	8,5	13,0		14,0	1,0	15,0	14,0
20	5	8-8-8-8-8		4,5	8,5	13,0		14,0	1,0	15,5	15,0
	7	5-6-5-4-5-6-5		4.5	9.5	14.0		15.0	1.0	16.0	16,0
21	5	9-8-8-8-9		4,5	9,0	13,5		14,0	1,5	16,0	18,0
	7	6-6-6-6-6-6-6		5,0	10,0	15,0		16,0	1,5	17,5	20,0
	9	4-4-6-5-4-5-6-4-4		5,0	11,0	16,0		17,0	1,5	18,5	22,0
	11	4-4-3-3-5-4-5-3-3-4-4		5.5	15.5	21.0		17.5	1.5	19.0	24,0
21/15	7	6-6-6-6-6-6-6		5,0	10,0	15,0		16,0	1,5	17,5	20,0
	9	4-4-6-5-4-5-6-4-4		5,0	11,0	16,0		17,0	1,5	18,5	22,0
	11	3-3-4-4-5-4-5-4-4-3-3		5.5	15.5	21.0		17.5	1.5	19.0	24,0
24	5	9-10-10-10-9		5,0	10,0	15,0		16,0	1,5	17,5	21,0
	7	6-6-8-8-8-6-6		5,0	11,5	16,5		17,5	1,5	19,0	22,0
	9	6-5-6-5-4-5-6-5-6		5,0	12,0	17,0		18,0	1,5	19,5	23,0
	11	4-4-5-4-5-4-5-4-5-4-4		5.5	16.5	22.0		23.5	1.5	25.0	24,0
27	7	9-6-8-8-8-6-9		5,0	12,5	17,5		18,5	2,0	20,5	27,0
	9	6-6-6-6-6-6-6-6-6		5,5	17,5	23,0		24,0	2,0	26,0	29,0
	11	4-5-5-6-5-4-5-6-5-5-4		5.5	21.5	27.0		28.0	2.0	30.0	31,0
28	7	8-8-8-8-8-8-8		5,0	13,0	18,0		19,0	2,0	21,0	28,0
	9	7-6-6-6-6-6-6-6-7		5,5	17,5	23,0		24,0	2,0	26,0	30,0
	11	5-5-5-6-5-4-5-6-5-5-5		5.5	22.5	28.0		29.0	2.0	31.0	32,0

Spray line **Super-L** sprayer boom with single nozzles or multi-nozzles

Arbeitsbreite	Anzahl Teilbreiten	Anzahl Düsen pro Teilbreite	Restmenge	verdünnbar •	nicht verdünnbar •	gesamt •	Restmenge bei Druck-Umlauf-System (DUS)	verdünnbar •	nicht verdünnbar •	gesamt •	Gewicht
[m]				[l]							[kg]
21	5	8-9-8-9-8		4.5	9.0	13.5		14.5	1.0	15.5	19,0
	7	6-6-7-4-7-6-6		5.0	10.5	15.5		17.0	1.0	18.0	19,0
	9	6-4-5-4-4-4-5-4-6		5.5	16.0	21.5		23.0	1.5	24.5	20,0
	11	3-3-4-5-4-4-4-5-4-3-3		5.5	22.0	27.5		28.5	1.5	30.0	20,0
24	5	9-10-10-10-9		5.0	10.0	15.0		16.0	1.5	17.5	20,0
	7	6-6-8-8-8-6-6		5,0	11,5	16,5		17,5	1,5	19,0	22,0
	9	6-5-5-5-6-5-5-5-6		5.5	17.0	22.5		23.5	2.0	25.5	28,0
	11	5-4-5-4-4-4-4-4-5-4-5		5.5	22.5	28.0		29.0	2.0	31.0	30,0
	13	3-4-4-3-4-4-4-4-4-3-4-4-3		6.0	25.0	31.0		33.0	2.0	35.0	32,0
27	7	8-7-8-8-8-7-8		5,0	12,5	17,5		18,5	2,0	20,5	27,0
	9	6-6-6-6-6-6-6-6-6		5,5	17,5	23,0		24,0	2,0	26,0	29,0
	11	4-4-4-5-7-6-7-5-4-4-4		5.5	23.0	28.5		29.0	2.0	31.0	35,0
	13	4-4-4-5-4-4-4-4-4-5-4-4-4		6.0	25.5	31.5		33.5	2.0	35.5	38,0
28	7	9-7-8-8-8-7-9		5,0	13,0	18,0		19,0	2,0	21,0	28,0
	9	7-6-6-6-6-6-6-6-7		5,5	17,5	23,0		24,0	2,0	26,0	30,0
	11	4-4-5-5-7-6-7-5-5-4-4		5.5	23.0	28.5		29.0	2.0	31.0	36,0
	13	4-4-5-4-4-5-4-5-4-4-5-4-4		6.0	25.5	31.5		33.5	2.5	36.0	28,0
30	9	8-7-6-6-6-6-6-7-8		5,5	18,0	23,5		24,0	2,5	26,5	32,0
	11	5-5-5-6-6-6-6-6-5-5-5		6.0	22.5	28.5		29.0	2.5	31.5	39,0
	13	3-3-4-5-5-7-6-7-5-5-4-3-3		6.0	26.0	32.0		34.0	2.5	36.5	41,0
32	9	8-6-7-7-8-7-7-6-8		5,5	18,5	24,0		24,0	2,5	27,0	34,0
	11	5-6-6-6-6-6-6-6-6-6-5		6.0	22.5	28.5		28.5	2.5	31.0	41,0
	13	5-5-5-5-5-5-4-5-5-5-5-5-5		6.0	26.5	32.5		34.0	2.5	36.5	43,0
33	9	7-8-7-7-8-7-7-8-7		5,5	19,0	24,5		25,0	2,5	27,5	35,0
	11	6-6-6-6-6-6-6-6-6-6-6		6,0	23,0	29,0		29,5	2,5	32,0	37,0
	13	5-5-5-5-5-5-6-5-5-5-5-5-5		6.0	27.0	33.0		34.0	3.0	37.0	44,0
36	7	10-10-10-12-10-10-10		5,0	16,0	21,0		21,5	3,0	24,5	36,0
	9	9-9-7-7-8-7-7-9-9		5,5	19,5	25,0		25,5	3,0	28,5	38,0
	11	8-7-6-6-6-6-6-6-6-7-8		6.0	23.0	29.0		29.5	3.0	32.5	45,0
	13	6-6-6-5-5-5-5-5-5-6-6-6-6		6.5	27.0	33.5		34.0	3.0	37.0	47,0
36/24	9	6-7-(9+1)-9-10-9-(9+1)-7-6		5.5	19.5	25.0		25.5	3.0	28.5	43,0
	11	6-7-(5+1)-6-8-8-8-6-(5+1)-7-6		6.0	23.0	29.0		29.5	3.0	32.5	42,0
	13	6-7-6-5-5-5-6-5-5-5-6-7-6		6.5	27.0	33.5		34.0	3.0	37.0	47,0
39	9	7-9-9-9-10-9-9-9-7		5,5	20,5	26,0		26,5	3,0	29,5	41,0
	11	7-6-7-7-8-8-8-7-7-6-7		6.0	24.0	30.0		30.5	3.0	33.5	44.0
	13	6-6-6-6-6-6-6-6-6-6-6-6-6		6,5	28,0	34,5		35,0	3,0	38,0	47,0
40	9	8-9-9-9-10-9-9-9-8		5,5	21,0	26,5		27,0	3,0	30,0	42,0
	11	8-6-7-7-8-8-8-7-7-6-8		6.0	24.0	30.0		30.5	3.0	33.5	45,0
	13	7-6-6-6-6-6-6-6-6-6-6-6-7		6.5	28.0	34.5		35.0	3.0	38.0	48,0

6.9.2 Single nozzles

Fig. 104/...

(1) Nozzle body with bayonet connection (standard).

(2) Diaphragm. If the pressure in the spray line falls below approx. 0.5 bar, the spring element (3) presses the diaphragm onto the diaphragm seat (4) in the nozzle body. This ensures that when the sprayer boom is switched off, the nozzles are deactivated without subsequent dripping.

(3) Spring element.

(4) Diaphragm seat.

(5) Slider - holds the entire diaphragm valve in the nozzle body.

(6) Nozzle filter; **fitted as standard on machines with 50 mesh/inch**, is inserted from below into the nozzle body. Refer to the "Nozzle filter" section.

(7) Rubber seal.

(8) Nozzle.

(9) Bayonet connection.

(10) Coloured bayonet cap.

(11) Spring element housing.

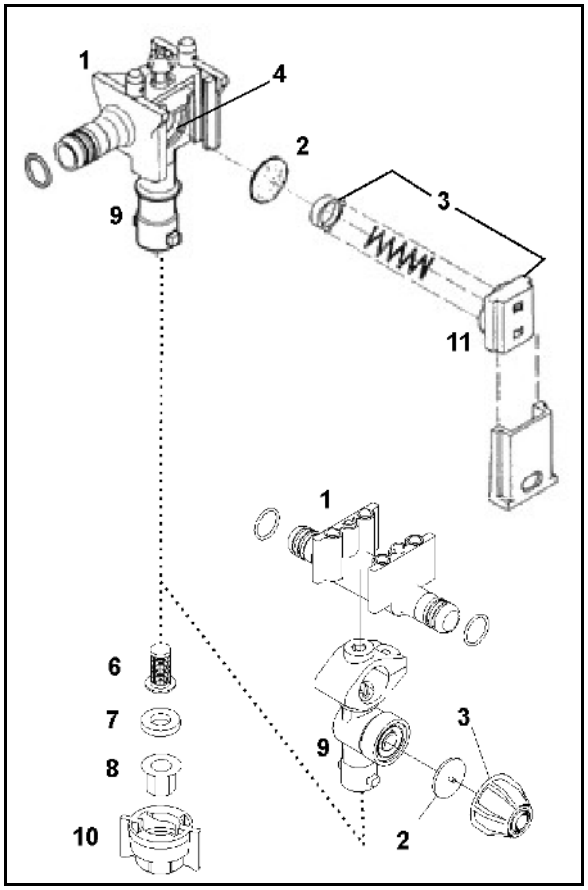


Fig. 104

6.9.3 Multi nozzles (optional)

When using multiple nozzle types, it is beneficial to use multi nozzles (Fig. 105). In each case, the nozzle pointing upwards is the one that is supplied.

Turning the multi nozzles head (Fig. 105/1) anticlockwise brings a different nozzle into play.

The multi nozzles head is switched off in the intermediate positions. This provides the possibility of reducing the working width of the boom.

Rinse the spray lines before twisting the multi nozzles head onto another nozzle type.

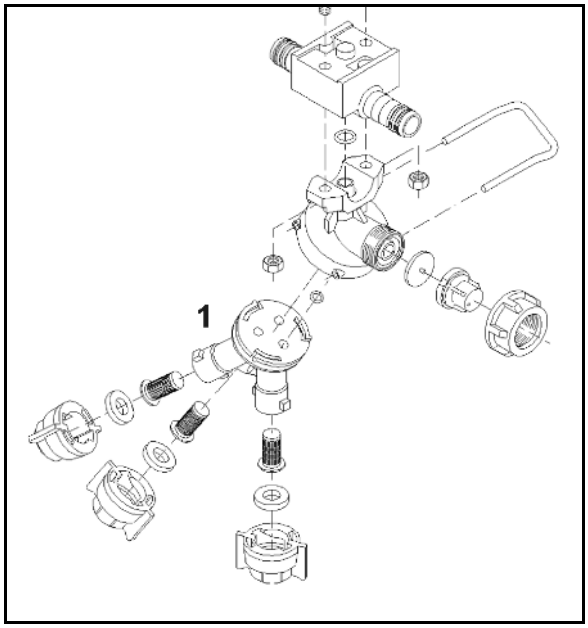


Fig. 105

(1) Nozzle carrier.

(2) Triple nozzle head.

(3) Diaphragm. If the pressure in the nozzle line falls below approx. 0.5 bar, the spring element (4) presses the diaphragm onto the diaphragm seat (5) in the three-way nozzle carrier. This ensures that when the sprayer boom is switched off, the nozzles are deactivated without subsequent dripping.

(4) Spring element.

(5) Diaphragm seat.

(6) Sleeve nut - holds the entire diaphragm valve in the three-way nozzle carrier.

(7) Nozzle filter; fitted as standard on machines with 50 mesh/inch.

(8) Rubber seal.

(9) Bayonet cap.

(10) O-ring.

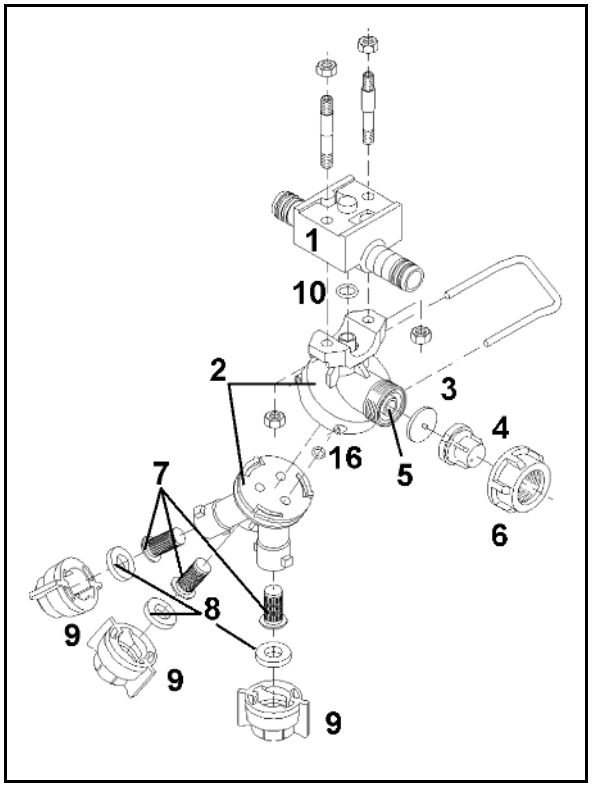


Fig. 106

6.9.4 Electric boundary nozzles (optional)

Using boundary nozzle switching, the last nozzle can be switched off from the tractor and a boundary nozzle can be electrically switched on 25 cm further out (right at the edge of the field).

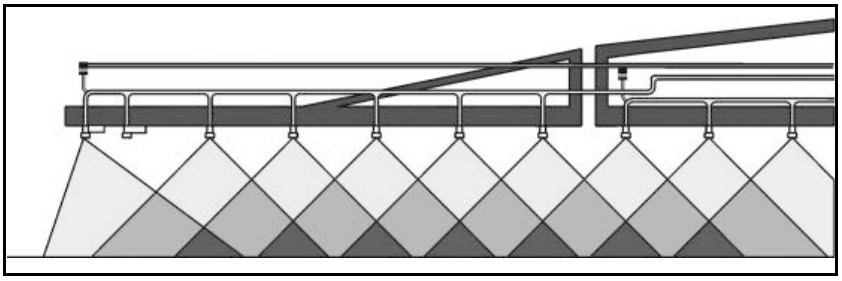


Fig. 107

6.9.5 Electric end nozzle switching (optional)

Using end nozzle switching, up to three of the outer nozzles at the edge of the field close to a water source can be electrically switched off from the tractor).

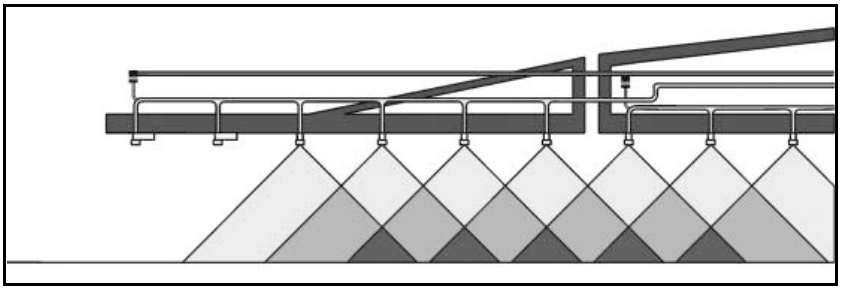


Fig. 108

6.9.6 Electric additional nozzle switching (optional)

With the additional nozzle switching, another exterior nozzle is cut in, increasing the working width by one metre.

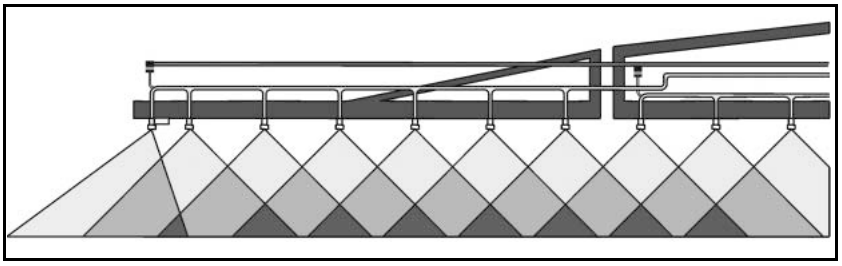


Fig. 109

6.10 Line filter for spray lines (optional)

Line filters (Fig. 110/1) are

- fitted in the spray lines in each part width section.
- an additional measure to avoid contamination of the spraying nozzles.

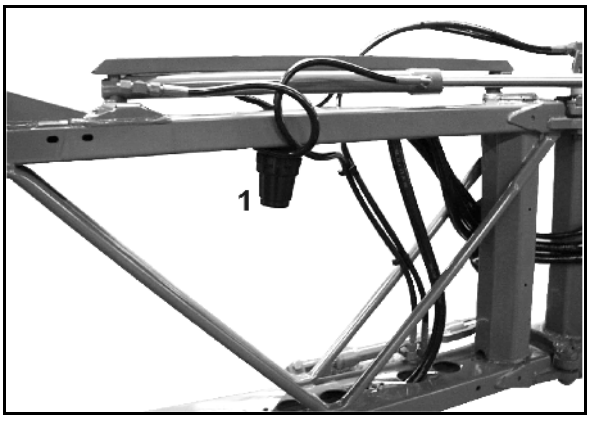


Fig. 110

Overview of the filter inserts

- Filter insert with 50 mesh/inch (blue)
- Filter insert with 80 mesh/inch (grey)
- Filter insert with 100 mesh/inch (red)

6.11 Automatic single nozzle control (optional)

50 cm part width sections can be controlled separately by the electric single nozzle control. In combination with the automatic part width section control "Section Control", overlapping can be reduced to a minimum area.

6.11.1 Single nozzle control AmaSwitch

Each nozzle can be switched on and off separately via Section Control.

6.11.2 4-way AmaSelect single nozzle control

- The sprayer boom is fitted with 4-way nozzle bodies. Each of them is operated by an electric motor.
- The nozzles can be switched on or off as desired (depending on Section Control).
- Due to the 4-way nozzle bodies, several nozzles can be simultaneously active in a nozzle body.
- Alternatively, the nozzles can be manually selected.
- For boundary treatment, an extra nozzle body can be separately configured.
- LED single nozzle illumination integrated in the nozzle body.
- Nozzle distance of 25 cm possible (optional)

6.12 Special optional equipment for liquid fertiliser

There are currently two main types of liquid fertiliser available:

- Ammonium nitrate / urea solution (AUS) with 28 kg N per 100 kg AUS.
- An NP solution 10-34-0 with 10 kg N and 34 kg P_2O_5 per 100 kg NP solution.

If the liquid fertiliser is sprayed using flat-fan nozzles, multiply the corresponding values from the spray table for the spray rate (l/ha) by 0.88 for AUS and by 0.85 for NP solutions, as the spray rates listed (in l/ha) only apply for water.

As a rule:

Use coarse-dropped application for liquid fertiliser to avoid chemical burns to the plants. Overly large drops roll off the leaf and drops which are too small cause a magnifying glass effect, which burns the leaves. Too much fertiliser may cause burns to appear on the leaves due to the salt concentration in the fertiliser.

As a rule, do not spray more liquid fertiliser than, for example, 40 kg N (see also "Conversion table for spraying liquid fertiliser"). Always discontinue nozzle-based AUS fertilisation at development stage EC-39, because chemical burns on ears have a particularly bad effect.

6.12.1 Three-ray nozzles (optional)

The use of three-ray nozzles for applying liquid fertiliser is beneficial if the liquid fertiliser needs to be taken up more by the roots of the plant than through the leaves.

Thanks to its three openings, the dosing aperture, which is integrated into the nozzle, ensures a coarse-dropped, almost depressurised distribution of the liquid fertiliser. This prevents an undesirable spray mist and the formation of smaller drops. The coarse drops produced by the three-ray nozzle hit the plants with little force and roll off their surface. **Although this avoids damage from burns to the greatest extent possible, avoid the use of three-ray nozzles for late top dressing and use drag hoses.**

For all three-ray nozzles listed in the following, only use the black bayonet nut.

Different three-ray nozzles and their operational areas (at 8 km/h)

- yellow 50 - 80l AUS / ha
- red 80 - 126l AUS / ha
- blue 115 - 180l AUS / ha
- white 155 - 267l AUS / ha

6.12.2 7 hole nozzles / FD nozzles (optional)

The same conditions apply for using 7 hole nozzles / FD nozzles as for the three-ray nozzles. In contrast to the three-ray nozzle, in the case of the 7 hole nozzle / FD nozzles, the outlets are not oriented downwards, but instead point to the side. This allows very large drops to be produced on the plants using only slight impact forces.

Fig. 111: → 7 hole nozzle

Fig. 112: → FD nozzle

Fig. 111

Fig. 112

The following 7-hole nozzles are available

- SJ7-02-CE 74 – 120l AUS (at 8 km/h)
- SJ7-03-CE 110 – 180l AUS
- SJ7-04-CE 148 – 240l AUS
- SJ7-05-CE 184 – 300l AUS
- SJ7-06-CE 222 – 411l AUS
- SJ7-08-CE 295 – 480l AUS

The following FD nozzles are available

- FD 04 150 - 240 l AHL/ha (at 8 km/h)
- FD 05 190 - 300 l AHL/ha
- FD 06 230 - 360 l AHL/ha
- FD 08 300 - 480 l AHL/ha
- FD 10 370 - 600 l AHL/ha*

6.12.3 Drag hose equipment for Super-S boom (optional)

Drag hose unit with dosing discs (no. 4916-39) for late top dressing with liquid fertiliser

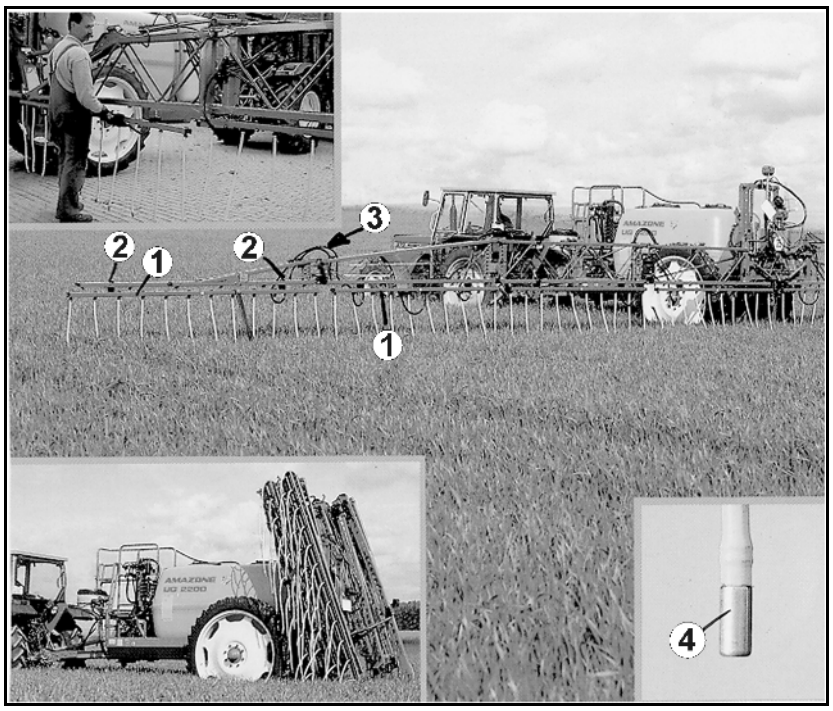


Fig. 113

Fig. 113

(1) Numbered, separate drag hose part width sections with 25 cm nozzle distance and hose distance. No. 1 on the left-hand side is fitted on the outside (looking in the direction of travel), no. 2 next to it and so on.

(2) Thumb nuts for securing the drag hose unit.

(3) Turned plug connection for connecting the hoses.

(4) Metal weights - stabilise the position of the hoses during operation.

The dosing discs determine the spray rate [l/ha].

The following dosing discs are available

- 4916-26 dia. 0.65 50 - 104 l AUS/ha (at 8 km/h)
- 4916-32 dia. 0.8 80 - 162 l AUS/ha
- 4916-39 dia. 1.0 115 - 226 l AUS/ha (standard)
- 4916-45 dia. 1.2 150 - 308 l AUS/ha
- 4916-55 dia. 1.4 225 - 450 l AUS/ha

Refer to the section "Spray table for the drag hose unit", Seite 234.

6.12.4 Drag hose equipment for Super-L boom (optional)

- with dosing discs for late top dressing with liquid fertiliser

Fig. 114/...

(1) Drag hoses at 25 cm intervals, after fitting the 2nd spray line.

(2) Bayonet connection with dosing discs.

(3) Metal weights - stabilise the position of the hoses during operation.

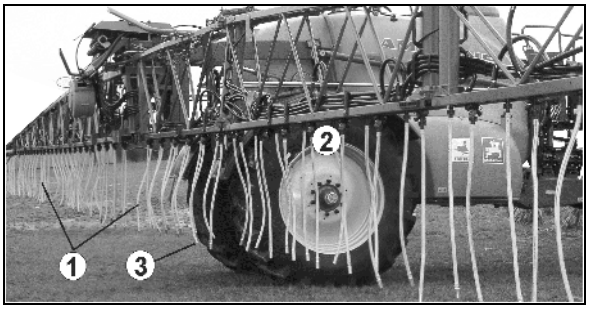


Fig. 114

Fig. 115/...

(1) Deflector hoop for the transport position.

(2) Transport position raised by lowering the transport hook

(3) Spacing runners

Remove both spacing runners (Fig. 115/3) when operating drag hoses.

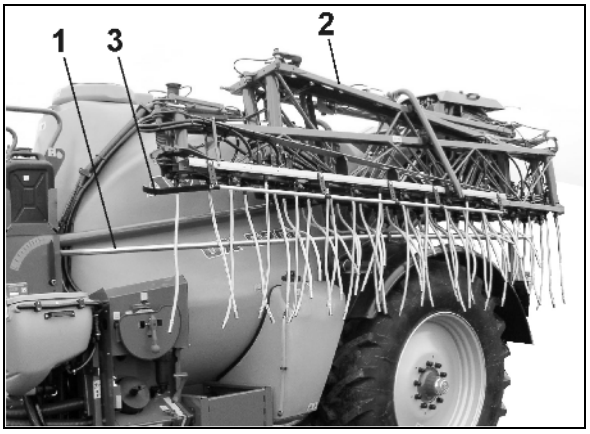


Fig. 115

Fig. 116/...

(1) one setting tap for every boom part width section:

- **a** Spraying via both spray lines with drag hoses
- **b** Spraying via a standard spray line
- **c** Spraying via the 2nd spray line only

Remove drag hoses for normal spraying operation.

After removing the drag hoses, seal off the nozzle bodies with blanks

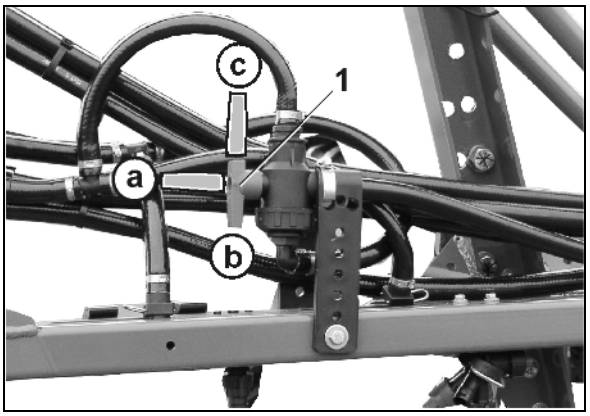


Fig. 116

Fig. 117/...

(1) Transport hook

Screw on both transport hooks lower down when operating drag hoses. In transport position, the distance between nozzle and mud guard must be 20 cm.
For normal spraying, screw both transport hooks back into the original position.

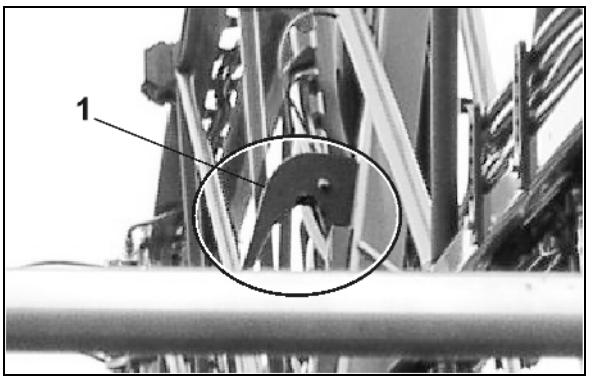


Fig. 117

6.13 Foam marker (optional)

The **foam marker** (Fig. 118/1 and Fig. 118/3), which can be retrofitted at any point, makes it possible to **drive the next bout precisely** when spraying **fields without marked-out tramlines**.

Marking involves the use of **foam bubbles**. The foam bubbles are laid at adjustable intervals of approx. 10 – 15 metres, providing a **clearly-visible orientation line**. The foam bubbles dissolve after a certain time without leaving any residue behind.

Set the **interval between the individual applications of bubbles** using the slotted screw as follows:

- turn **clockwise** - distance is increased,
- turn **anti-clockwise**, - distance is decreased.

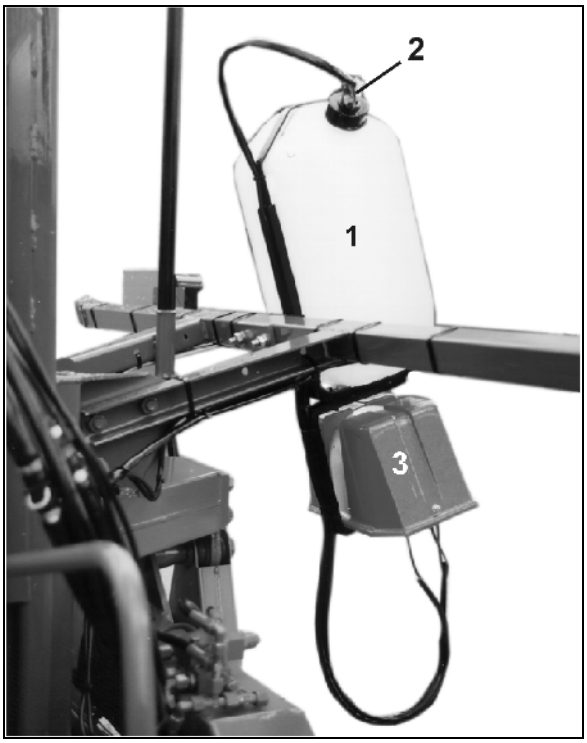


Fig. 118

Foam marker:

- **Super-S boom Fig. 118/...:**
- **Super-L boom Fig. 119/...**

(1) Tank

(2) Slotted screw

(3) Compressor

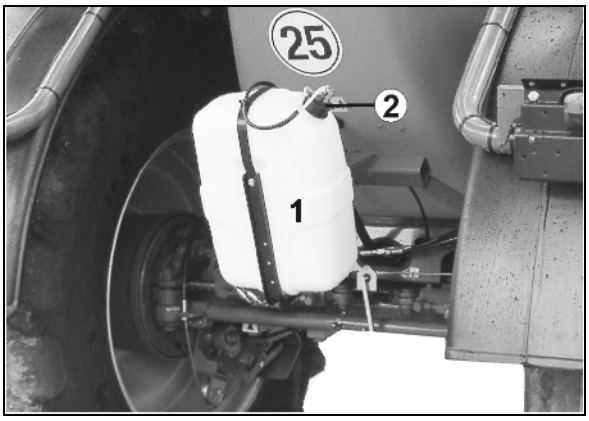


Fig. 119

Fig. 120/...

(1) Air and liquid agitator

(2) Flexible plastic nozzle

See operating manual for software ISOBUS.

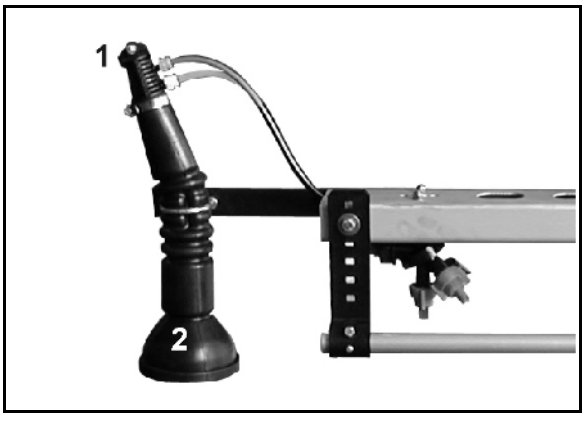


Fig. 120

Operating device

For implements without control terminal:

Fig. 121/...

(1) Left-hand foam marker on

(2) Right-hand foam marker on

(3) Foam marker off

(4) Connection to the compressor

(5) Connection to the tractor power supply

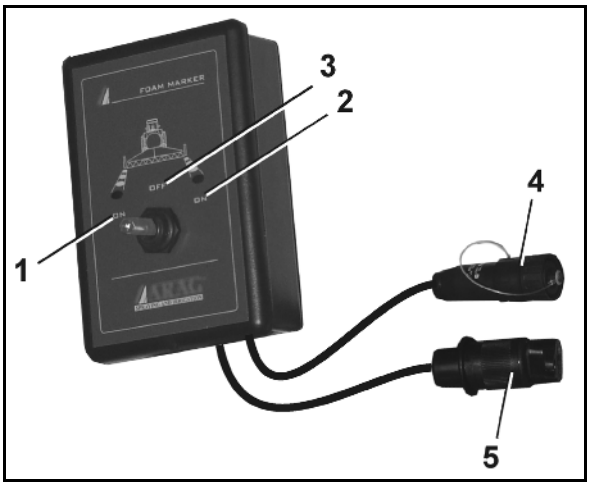


Fig. 121

6.14 Pressure circulating system (DUS) (optional)

- For normal spraying operation, the pressure circulating system should usually be switched on.
- When using drag hoses, the pressure circulating system should usually be switched off.

The pressure circulating system

- enables the constant circulation of liquid in the spray line. For these purposes, a suction port hose (Fig. 122/1) is assigned to each part width section.
- enables operation using spray liquid or flushing water, as desired.
- reduces the undiluted residue for all spray lines to 2 l.

The constant circulation of liquid

- enables production of an even spray pattern right from the start, because spray liquid is available at every spraying nozzle immediately after the sprayer boom is switched on, with no delay.
- prevents damage to the spray line.

The principal components of the pressure circulating system are:

- one suction port hose (Fig. 122/1) per part width section.
- the DUS switch tap (Fig. 123/1).
- the DUS pressure relief valve (Fig. 123/2). The DUS pressure relief valve is permanently set at the factory and reduces the pressure in the pressure circulating system to 1 bar.

→ If the DUS switch tap is in position (Fig. 123/A), the pressure circulating system is switched ON.

→ If the DUS switch tap is in position (Fig. 123/B), the pressure circulating system is switched OFF.

→ If the DUS switch tap is in position (Fig. 123/C), liquid can be drained from the field sprayer.

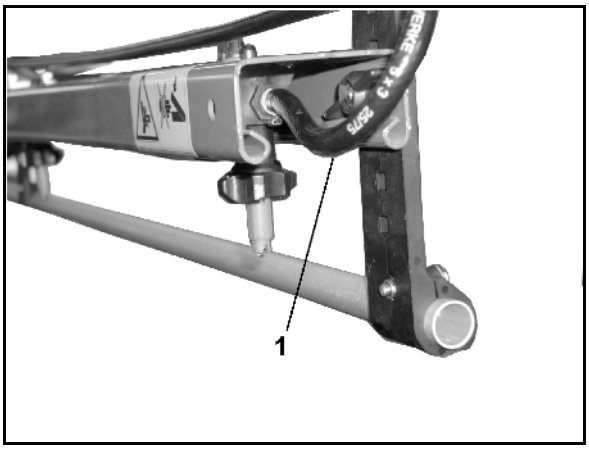


Fig. 122

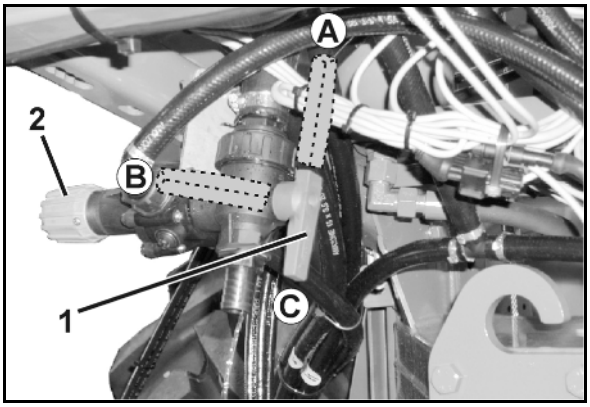


Fig. 123

Overview – pressure circulating system (DUS)

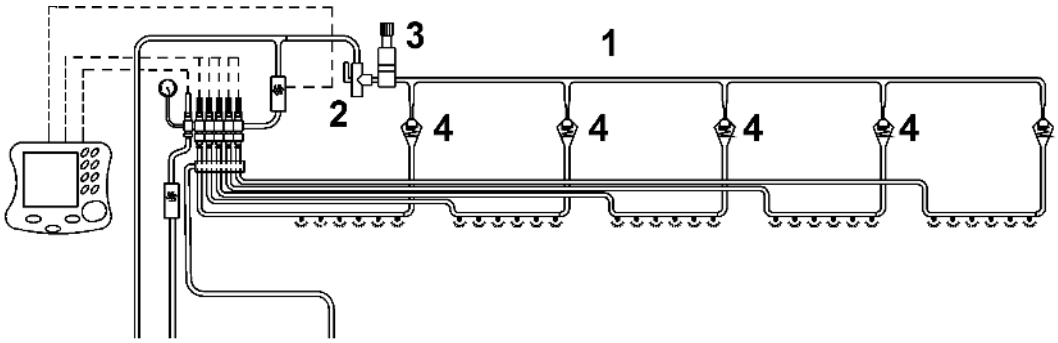


Fig. 124

(1) Pressure circulating system (DUS)

(2) DUS switch tap

(3) DUS pressure limiting valve

(4) DUS return valve

6.15 Lift module

(optional)

The lift module allows the sprayer boom to be raised by an additional 70 cm to a nozzle height of 3.20 m.

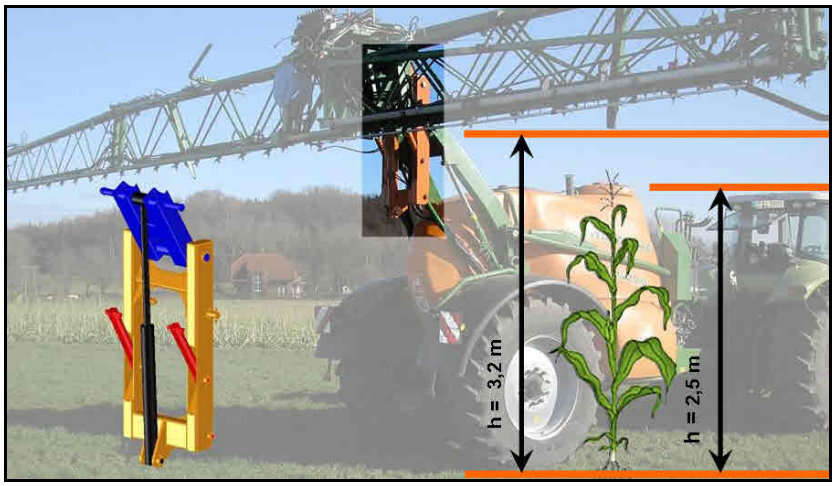


Fig. 125

The lift module is actuated using the tractor control unit *yellow*.

DANGER

Risk of accidents and danger of damaging the machine.

- When driving on the roads, the sprayer boom must not be raised above the lifting module.

→ The total height of the machine with lifting module can be considerably higher than 4 m.

- Use the lifting module only when the sprayer boom is folded out.
- Lower the lifting module again before folding in the sprayer boom. The sprayer boom can otherwise not be put into the transport lock.
- Always lift or lower the lifting module to the end position!

7 Commissioning

This section contains information

- on commissioning your machine.
- on checking if it is possible to connect the machine to your tractor.

- Before operating the machine for the first time the operator must have read and understood the operating manual.
- Comply with the section "Safety information for the user", starting on page 29 when
  - coupling and uncoupling the machine
  - transporting the machine
  - using the machine
- Only couple and transport the machine to a tractor which is suitable for the task.
- The tractor and machine must meet the national road traffic regulations.
- The operator and the user shall be responsible for compliance with the statutory road traffic regulations.

WARNING

Risk of crushing, shearing, cutting, and being drawn in or trapped in the vicinity of hydraulically or electrically actuated components.

Do not block the operator controls on the tractor which are used for hydraulic and electrical movements of components, e.g. folding, swivelling and pushing movements. The movement must stop automatically when you release the appropriate control. This does not apply to equipment movements that:

- are continuous or
- are automatically locked or
- require a floating position or pressed position to function

7.1 Checking the suitability of the tractor

WARNING

Risk of breaking during operation, insufficient stability and insufficient tractor steering and braking power from improper use of the tractor.

- Check the suitability of your tractor, before connecting the machine to the tractor.

  You may only connect the machine to tractors suitable for the purpose.

- Carry out a brake test to check whether the tractor achieves the required braking rate with the machine connected.

Requirements for the suitability of a tractor are, in particular:

- Permissible total weight
- Permissible approved axle loads
- Permissible drawbar load at the tractor coupling point
- Load capacity of the tyres fitted
- The approved trailer load must be sufficient

  You can find this data on the rating plate or in the vehicle documentation and in the tractor operating manual.

The front axle of the tractor must always be subjected to at least 20% of the dead-weight of the tractor.

The tractor must achieve the brake rate specified by the tractor manufacturer, even with the machine connected.

7.1.1 Calculating the actual values for the total tractor weight, tractor axle loads and tyre load capacities, as well as the minimum ballast

The permissible total tractor weight, specified in the vehicle documentation, must be greater than the sum of the

- Tractor empty weight,
- Ballast weight and
- Total weight of the connected machine or drawbar load of the connected machine

This information is only valid for the Federal Republic of Germany:

If, having tried all possible alternatives, it is not possible to comply with the axle loads and / or the permissible total weight, then a survey by an officially-recognised motor vehicle traffic expert can, with the approval of the tractor manufacturer, be used as a basis for the authority responsible to issue an exceptional approval according to § 70 of the German Regulations Authorising the Use of Vehicles for Road Traffic and the required approval according to § 29, paragraph 3 of the German Road Traffic Regulations.

7.1.1.1 Data required for the calculation

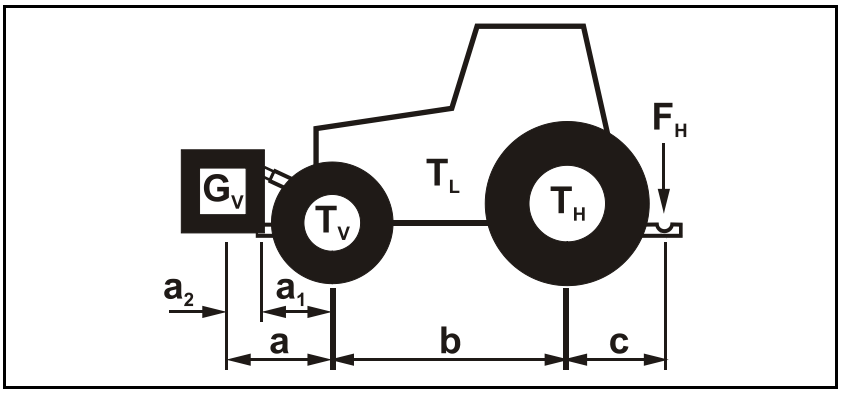


Fig. 126

T_L	[kg]	Tractor empty weight	See tractor operating manual or vehicle documentation
T_V	[kg]	Front axle load of the empty tractor	
T_H	[kg]	Rear axle load of the empty tractor	
G_V	[kg]	Front weight (if available)	See front weight in technical data, or weigh
F_H	[kg]	Maximum drawbar load	See technical data of machine
a	[m]	Distance between the centre of gravity of the front machine mounting or the front ballast and the centre of the front axle (total $a_1 + a_2$)	See technical data of tractor and front machine mounting or front ballast or measurement
a_1	[m]	Distance from the centre of the front axle to the centre of the lower link connection	See tractor operating manual or measurement
a_2	[m]	Distance between the centre of the lower link connection point and the centre of gravity of the front machine mount or front ballast (centre of gravity distance)	See technical data of front machine mounting or front ballast or measurement
b	[m]	Tractor wheel base	See tractor operating manual or vehicle documents or measurement
c	[m]	Distance between the centre of the rear axle and the centre of the lower link connection	See tractor operating manual or vehicle documents or measurement

7.1.1.2 Calculation of the required minimum ballasting at the front $G_{V\ min}$ of the tractor for assurance of the steering capability

$$G_{V\ \min} = \frac{F_H \bullet c - T_V \bullet b + 0{,}2 \bullet T_L \bullet b}{a + b}$$

Enter the numeric value for the calculated minimum ballast $G_{V\ min}$, required on the front side of the tractor, in the table (Section 7.1.1.7).

7.1.1.3 Calculation of the actual front axle load of the tractor $T_{V\ tat}$

$$T_{V\ tat} = \frac{G_V \bullet (a + b) + T_V \bullet b - F_H \bullet c}{b}$$

Enter the numeric value for the calculated actual front axle load and the approved tractor front axle load specified in the tractor operating manual in the table (Section 7.1.1.7).

7.1.1.4 Calculation of the actual total weight of the combined tractor and machine

$$G_{tat} = G_V + T_L + F_H$$

Enter the numeric value for the calculated actual total weight and the approved total tractor weight specified in the tractor operating manual in the table (Section 7.1.1.7).

7.1.1.5 Calculation of the actual rear axle load of the tractor $T_{H\ tat}$

$$T_{H\ tat} = G_{tat} - T_{V\ tat}$$

Enter the numeric value for the calculated actual rear axle load and the approved tractor rear axle load specified in the tractor operating manual in the table (Section 7.1.1.7).

7.1.1.6 Tyre load capacity

Enter the double value (two tyres) of the approved load capacity (see, for example, tyre manufacturer's documentation) in the table (Section 7.1.1.7).

7.1.1.7 Table

	Actual value according to calculation		Permissible value according to tractor operating manual		Double the permissible load capacity (two tyres)
Minimum ballast front / rear	/ kg		--		--
Total weight	kg	≤	kg		--
Front axle load	kg	≤	kg	≤	kg
Rear axle load	kg	≤	kg	≤	kg

- You can find the permissible values for the total tractor weight, axle loads and load capacities in the tractor registration papers.
- The actually calculated values must be less than or equal to (≤) the permissible values.

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through insufficient stability and insufficient tractor steering and brake power.

It is forbidden to couple the machine to the tractor used as the basis for calculation, if

- one of the actual, calculated values is greater than the permissible value.
- there is no front ballast (if required) attached to the tractor for the minimum front ballast ($G_{V\,min}$).

- You must use a front weight, which is equal to at least the required minimum front ballast ($G_{V\,min}$).

7.1.2 Requirements for tractor operation with attached machines

WARNING

Risk of breakage during operation of components through unapproved combinations of connecting equipment.

- Ensure:
  - that the connection fitting on the tractor possesses a permissible drawbar load sufficient for the actual drawbar load.
  - that the axle loads and weights of the tractor altered by the drawbar load are within the approved limits. If necessary, weigh them.
  - that the tractor's actual static rear axle weight does not exceed the permissible rear axle weight.
  - that the permissible total weight of the tractor is observed
  - that the approved load capacities of the tractor tyres are not exceeded.

7.1.2.1 Combination options for connection fittings and towing eyes

Fig. 127 shows permitted combination options for joining the connection fitting on the tractor and the towing eye on the machine in relation to the maximum permitted drawbar load.

You will find the maximum permitted drawbar load in the vehicle documentation or on the rating plate on the connection fitting of your tractor.

Maximum permissible drawbar load	Connection fitting on the tractor	Towing eye on the fixed drawbar trailer
2000 kg	Pin coupling DIN 11028 / ISO 6489-2	Towing eye 40 for hydraulic high-lift drawbar DIN 11043
	Non-automatic pin coupling DIN 11025	
3000 kg - ≤ 40 km/h 2000 kg - > 40 km/h	Trailer hook (hitch hook) ISO 6489-1	Towing eye (hitch ring) ISO 5692-1
	Trailer peg (Piton-fix) ISO 6489-4	
	Ball coupling 80	Ball bracket 80

Fig. 127

7.1.2.2 Calculating the actual D_C value for the combination to be coupled

WARNING

Risk of breakage of the connection fitting between tractor and machine due to improper use of the tractor.

Calculate the actual D_C value for your combination, made up of tractor and machine, to check whether the connection fitting on your tractor displays the required D_C value. The actual calculated D_C value for the combination must be less than or equal to (≤) the given D_C value of the connection fitting of your tractor.

The actual D_C value of a combination to be coupled is calculated as follows:

$$D_C = g \times \frac{T \times C}{T + C}$$

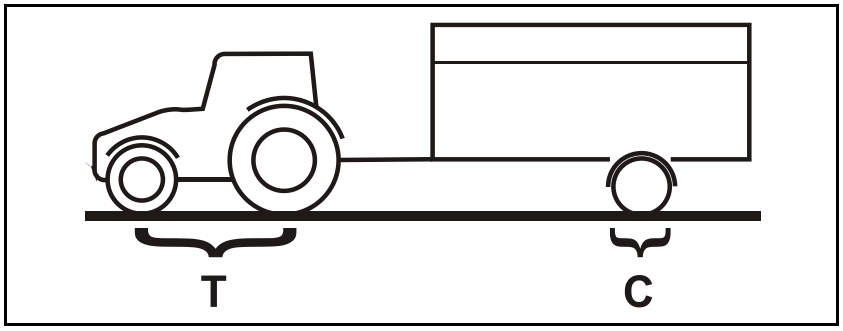


Fig. 128

T: Permissible total weight of your tractor in [t] (see tractor operating manual or registration papers)

C: Axle load of the machine loaded with the permitted mass (payload) in [t], without drawbar load

g: Acceleration due to gravity (9.81 m/s²)

Actual calculated D_C value for the combination		**D_C value given on the tractor for the connection fitting**
KN	≤	KN

You can find the D_C value for the connection fitting on the connection fitting itself / in the operating manual for your tractor.

7.1.3 Machines without their own brake system

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through inadequate brake power of your tractor.

The tractor must achieve the brake rate specified by the tractor manufacturer, even with the machine connected.

If the machine does not possess its own brake system:

- Then the actual tractor weight must be greater than or equal to (≥) the actual weight of the connected machines.

  In many countries, other regulations apply. In Russia, for example, the weight of the tractor must be double that of the attached machine.
- The maximum operational speed is 25 km/h.

7.2 Adjusting the length of the PTO shaft to the tractor

WARNING

Danger from

- **damaged and/or destroyed, flying parts for the operator / third party if the PTO shaft is compressed or pulls apart while the machine coupled to the tractor is being raised/lowered, because the length of the PTO shaft has not been adjusted properly.**
- **being caught and drawn in if the PTO shaft is installed incorrectly or if unauthorised design changes are made.**

Have the length of the PTO shaft checked in all operating positions by a specialist workshop and, if necessary, adjusted before coupling the PTO shaft to your tractor for the first time.

Always observe the operating manual supplied with the PTO shaft when adjusting the PTO shaft.

This adjustment of the PTO shaft applies only for the current tractor type. You may need to readjust the PTO shaft if you couple the machine to another tractor.

WARNING

Risk of being caught and drawn in if the PTO shaft is installed incorrectly or if unauthorised design changes are made.

Only a specialist workshop may make design changes to the PTO shaft. When doing so, read and follow the operating manual from the manufacturer.

Adjusting the length of the PTO shaft is permitted with consideration of the minimum profile overlap.

Design changes to the PTO shaft that are not described in the operating manual from the PTO shaft manufacturer are not permitted.

WARNING

Risk of crushing between the rear of the tractor and the machine when raising and lowering the machine to determine the shortest and longest operating position of the PTO shaft.

Only actuate the operator controls for the tractor's three-point linkage

- from the intended workstation.
- if you are outside of the danger area between the tractor and the machine.

WARNING

Risk of crushing from unintentional:

- **rolling of the tractor and the connected machine.**
- **lowering of the raised machine.**

Secure the tractor and machine from unintentionally starting or rolling and secure the raised machine against unintentional lowering before entering the danger zone between the tractor and raised machine in order to adjust the PTO shaft.

The PTO shaft is at its shortest when it is horizontal. The PTO shaft is at its longest when the machine is fully lifted.

1. Couple the tractor to the machine (do not connect the PTO shaft).
2. Apply the tractor's parking brake.
3. Determine the clearance height of the machine with the shortest and longest operating position for the PTO shaft.
   3.1 To do so, raise and lower the machine via the tractor's three-point hydraulic system.
   While doing so, actuate the manual controls for the tractor's three-point hydraulic system on the rear of the tractor, from the provided workstation.
4. Secure the machine, lifted in the measured clearance height, against unintentional lowering (for example, by supporting it or hooking it to a crane).
5. Secure the tractor from unintentional starting before entering the danger area between the tractor and machine.
6. When measuring the length and shortening the PTO shaft, read and follow the operating manual from the PTO shaft manufacturer.
7. Put the shortened halves of the PTO shaft back together.
8. Grease the universal joint shaft of the tractor and the gearbox input shaft before connecting the PTO shaft.
   The tractor symbol on the protective tube of the PTO shaft identifies the tractor-side connection of the PTO shaft.

7.3 Securing tractor / machine against accidental starting and rolling

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact when making interventions in the machine, through

- **unintentional falling of the unsecured machine raised using the tractor's three-point linkage.**
- **unintentional falling of raised, unsecured machine parts.**
- **unintentional start-up and rolling of the tractor-machine combination.**
- Secure the tractor and the machine against unintentional start-up and rolling before making any intervention in the machine.
- It is forbidden to make any intervention in the machine, such as installation, adjustment, troubleshooting, cleaning, maintenance and repairs
  - o when the machine is running
  - o for as long as the tractor engine is running with a connected PTO shaft / hydraulic system.
  - o when the ignition key is inserted in the tractor and the tractor engine with the connected PTO shaft / hydraulic system could be started unintentionally.
  - o when the tractor and machine are not secured against unintentional rolling using their parking brakes and/or wheel chocks.
  - o when moving parts are not locked against unintentional movement.

  When carrying out such work, there is a high risk of contact with unsecured components.

1. Lower the raised, unsecured machine / raised, unsecured parts of the machine.

→ This is how to prevent unintentional falling:

2. Shut down the tractor engine.
3. Remove the ignition key.
4. Apply the tractor's parking brake.
5. Secure the machine against unintentional rolling (only attached machine)
   - o On flat ground using the parking brake (if present) or wheel chocks.
   - o On uneven ground or slopes using the parking brake and wheel chocks.

7.4 Fitting wheels

If the machine is fitted with inflatable spare tyres, running wheels must be fitted before putting into operation.

WARNING

- **Only one permitted set of tyres may be used, as specified in the technical data (see page 55).**
- **Wheel rims that are suitable for the tyres used must have a rim that has been fully welded all the way round.**

- A hydraulic stand extension and ladder extension must be fitted in the case of tyres with a diameter greater than 1860 mm.
- Depending on the wheel track, the locking screw must be fitted if there is a steering axle, see page 82.

1. Lift machine slightly using lifting crane.

DANGER

Use the attachment points marked for lifting belts.

See also "Loading" section, page 39.

2. Loosen wheel nuts on the inflatable spare tyres.
3. Remove inflatable spare tyres.

CAUTION

Take care when removing the inflatable spare tyres and putting the running wheels in place.

4. Place the running wheels on threaded bolts.
5. Tighten wheel nuts.

Required tightening torque for wheel nuts: 510 Nm.

6. Lower machine and remove lifting belts.
7. After 10 operating hours, tighten wheel nuts.

7.5 Initial operation of service brake system

Perform a brake test while the trailed sprayer is empty, and again when it is loaded to test the braking behaviour of the tractor with coupled trailed sprayer.

We recommend that you have a specialist workshop coordinate the brakes on the tractor and trailed sprayer in order to attain optimum braking and minimum wear to brake linings (see "Maintenance" section, page 199).

7.6 Adjusting the system setting screw on the hydraulic block

- **Profi-folding only:**

Always adjust the system setting screw to the hydraulic system on your tractor. Increased hydraulic fluid temperatures are the result of an incorrectly adjusted system setting screw, caused by constant strain on the tractor hydraulics pressure relief valve.

Fig. 129/...

(1) System converting bolt

(2) LS connection for load sensing control line

Fig. 130/...

(1) Tractor connection for load sensing control line

(2) Tractor connection for the load sensing pressure hose

(3) Tractor connection for the pressure-free return flow

The tractor hydraulic system available determines the setting of the system setting screw on the hydraulic block (Fig. 129/1).

Depending on the tractor hydraulic system, the system setting screw must be

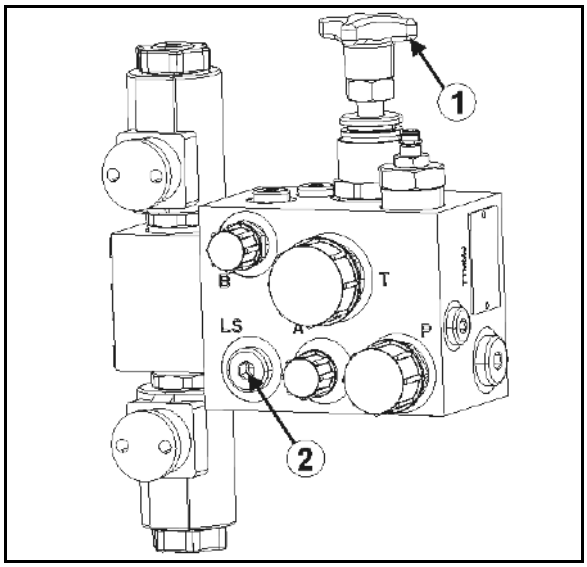


Fig. 129

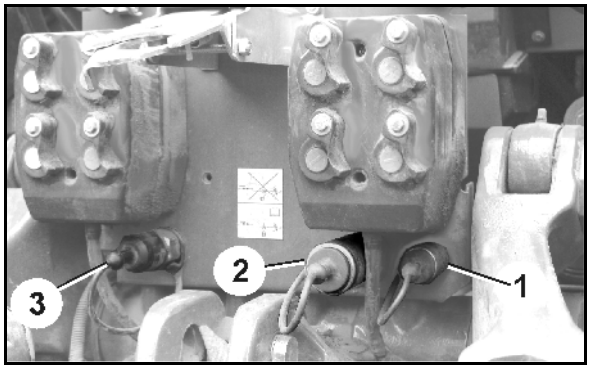


Fig. 130

- **screwed out** up to the stop (factory setting) on tractors with
  - open-centre hydraulic system (constant flow system, geared pump hydraulics).
  - setting pump with adjustable oil extraction via the control unit
- **screwed in** up to the stop (in contrast to the factory setting) on tractors with
  - closed-centre hydraulic system (constant pressure system, pressure regulated setting pump).
  - load-sensing hydraulic system (pressure and power controlled setting pump) with direct load-sensing pump connection. Using the flow control valve on the tractor, adjust the actual flow rate to the required flow rate.

- The machine must be depressurised before making adjustments.
- The hydraulic block can be found at the front on the right of the machine, behind the cover plate.

7.7 AutoTrail position encoder

If using AutoTrail, a holder for the position encoder (Fig. 131/1) must be fitted to the tractor.

The holder must be made according to the actual circumstances of the tractor with the sleeve with locking screw (Fig. 131/2) and metal plate (Fig. 131/3) provided.

When installed, the position encoder must be directly above the pivot point of the tractor pin coupling (Fig. 131/4).

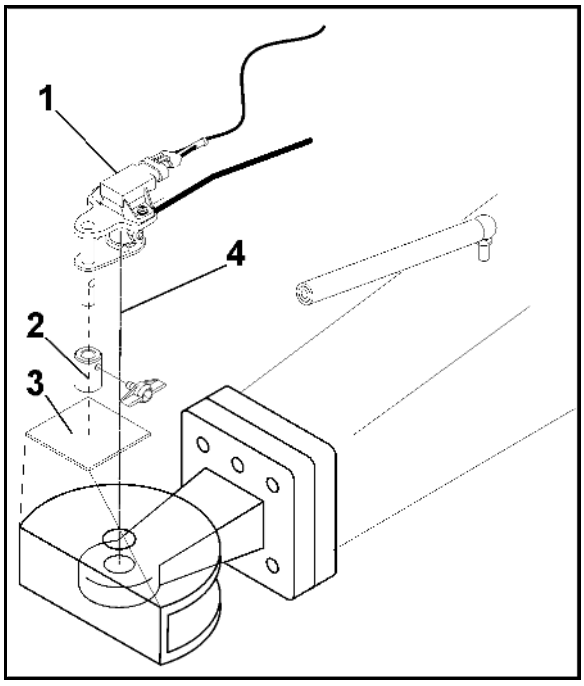


Fig. 131

- Keep the distance between the coupling point and position encoder (Fig. 132/ X) as small as possible (particularly with the hitch drawbar).
- In neutral position with the machine coupled, the rod of the position encoder must be pulled approximately 100 mm out of the holder.

  If necessary, fasten the holder in an alternative position.

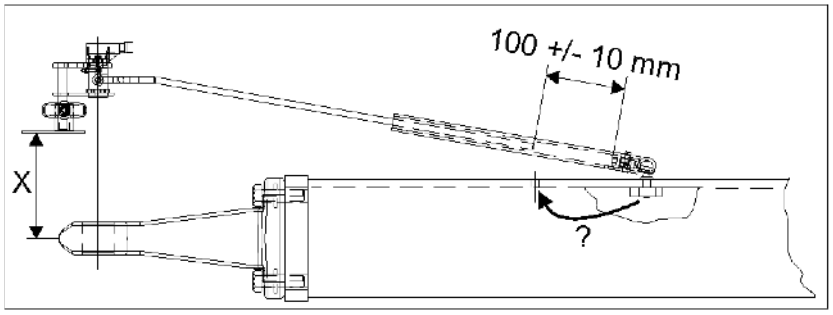


Fig. 132

7.8 Track setting of the adjustable axle (workshop task)

Adjust the track width of the implement so that the wheels of the sprayer run in the middle of the tractor's wheel tracks.

The track width (with 100 mm offset) is variably adjustable from 1,500 mm to 2,250 mm.

The adjustable track widths depend upon the wheel assembly (Fig. 133):

- Variable from 1,500 mm to 1,960 mm with wheel assembly according to position 1.
- Variable from 1,700 mm to 2,250 mm with wheel assembly according to position 2.

Tighten the wheel bolts with a torque of 510 Nm.

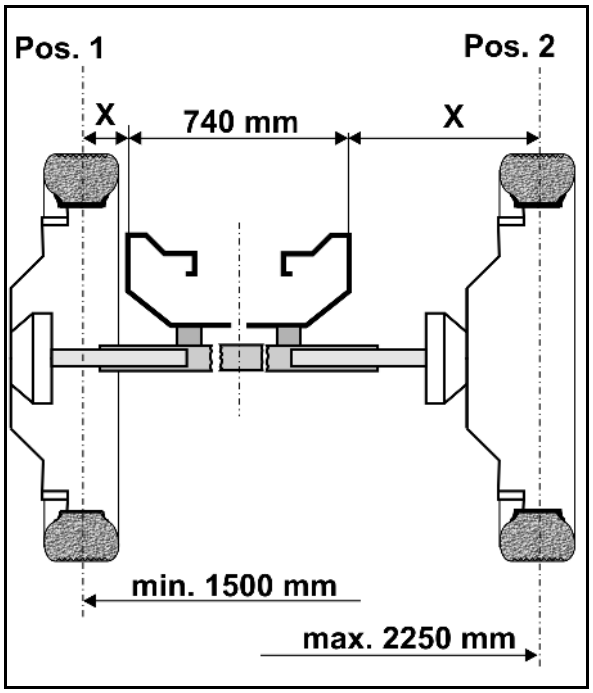


Fig. 133

$$X = \frac{\text{Desired track width [mm]} - 740\ \text{[mm]}}{2}$$

Perform the track width adjustment as follows

1. Hang the sprayer on the tractor.
2. Secure the tractor / implement against unintentional starting and rolling away.
3. Lift the sprayer on one side using a jack until the respective wheel lifts from the ground.
4. Undo the clamping screws (Fig. 134/1.2)..
5. Push in or pull out the axle halves to the desired position. Hereby determine dimension x from the outer edge of the base frame (Fig. 133/1) to the middle of the sprayer wheel and push in or pull out the axle halves respectively.
6. To align the axle, first tighten screws (Fig. 134/1) to a torque of 210 Nm.
7. Then tighten screws (Fig. 134/2) to a torque of 750 Nm.
8. Push in or pull out the axle halves of the opposite side in the same manner.

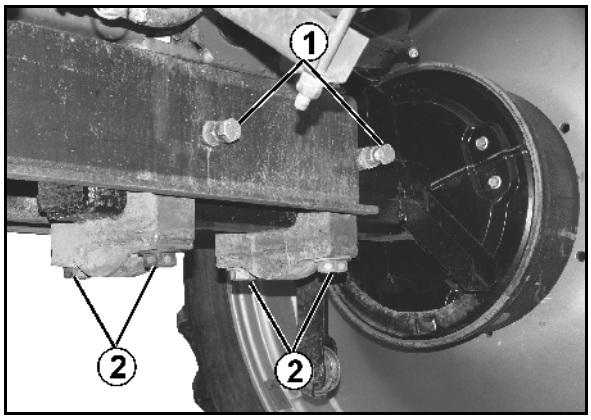


Fig. 134

8 Coupling and uncoupling the machine

When coupling and decoupling the machine, comply with the section "Safety information for the user", page 29.

WARNING

Risk of crushing from unintentional starting and rolling of the tractor and machine when coupling or uncoupling the machine.

When coupling or decoupling the machine, secure the tractor and machine against unintentional start-up and rolling before entering the danger area between the tractor and machine; refer to page 143.

WARNING

Risk of crushing between the rear of the tractor and the machine when coupling and uncoupling the machine.

Only actuate the operator controls for the tractor's three-point linkage

- from the intended workstation.
- if you are outside of the danger area between the tractor and the machine.

8.1 Coupling the machine

WARNING

Risk of breaking during operation, insufficient stability and insufficient tractor steering and braking power from improper use of the tractor.

You may only connect the machine to tractors suitable for this purpose. Refer to the section "Checking the suitability of the tractor", page 135.

WARNING

Risk of crushing when coupling the machine and standing between the tractor and the machine.

Instruct people to leave the danger area between the tractor and the machine before you approach the machine.

Any helpers may only act as guides standing next to the tractor and the machine, and may only move between the vehicles when both are at a standstill.

WARNING

Risk of crushing, being caught or pulled in, or impact when the machine is unexpectedly released from the tractor.

- Use the intended equipment to connect the tractor and the machine in the proper way.
- When coupling the machine to the tractor's three-point hydraulic system, ensure that the attachment categories of the tractor and the machine are the same.

  Be absolutely certain to upgrade the machine's category II lower link pin to category III using reducing sleeves if your tractor has a category III three-point linkage.
- Only use the upper and lower link pins provided to couple up the machine (original pins).
- Check the upper and lower link pins for visible defects whenever the machine is coupled. Replace the upper and lower link pins in the event of clearly visible wear.
- Secure the upper link pin and lower link pin in the attachment points of the three-point attachment frame against unintentional detachment using a linchpin.
- Perform a visual inspection to ensure that the upper and lower link hooks are correctly locked before reversing the tractor.

WARNING

Risk of energy supply failure between the tractor and the machine due to damaged power supply lines.

During coupling, check the course of the power supply lines. The power supply lines

- must give slightly to all movement of the connected machine without tensioning, kinking or rubbing.
- must not chafe against other parts.

1. Direct people away from the danger area between the tractor and machine before you approach the machine with the tractor.
2. Couple the supply lines first before coupling the machine with the tractor.
   - 2.1 Drive the tractor up to the machine, leaving a clearance of approximately 25 cm between tractor and machine.
   - 2.2 Secure the tractor against unintentional starting and unintentional rolling.
   - 2.3 Check whether the universal joint shaft of the tractor is switched off.
   - 2.4 Couple the PTO shaft and supply lines with the tractor.
   - 2.5 Hydraulic brake: fasten the parking brake pulling cable to the tractor.
3. Now reverse the tractor towards the machine so that the connection fitting can be coupled.
4. Couple the connection fitting.
5. Lift the stand into transport position.
6. Remove wheel chocks, release parking brake.

8.2 Uncoupling the machine

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through inadequate stability and tipping over of the uncoupled machine.

Park the empty machine on a horizontal space with a hard surface.

When uncoupling the machine, there must always be enough space in front of the machine so that you can align the tractor with the machine if necessary.

1. Park the empty machine on a horizontal space with a hard surface.
2. Uncouple the machine from the tractor.
   - 2.1 Secure the machine against unintentionally rolling. See page 143.
   - 2.1 Lower the stand to the parking position.
   - 2.2 **Un**couple the connection fitting.
   - 2.3 Draw the tractor forwards by approximately 25 cm.
   - → The space created between the tractor and the machine allows better access for decoupling the PTO shaft and the power supply lines.
   - 2.4 Secure the tractor and machine against unintentional starting and unintentional rolling.
   - 2.5 Decouple the PTO shaft.
   - 2.6 Place the PTO shaft in the holder.
   - 2.7 Uncouple the supply lines.
   - 2.8 Fasten the supply lines in the corresponding parking sockets.
   - 2.9 Hydraulic brake: detach parking brake pulling cable from tractor.

8.2.1 Manoeuvring the uncoupled machine

DANGER

You must be particularly careful when shunting the machine with the service brake system released, since only the manoeuvring vehicle is now braking the trailed sprayer.

The machine must be connected to the manoeuvring vehicle before you actuate the release valve on the trailer brake valve.

The manoeuvring vehicle must be braked.

The service brake system cannot be released using the release valve if the air pressure in the air reservoir drops below 3 bar (e.g. if the release valve has been actuated multiple times or if there are leaks in the brake system).

To release the service brake

- fill the air reservoir.
- Remove all air from the braking system at the drain valve on the air reservoir.

1. Connect the machine to the manoeuvring vehicle.
2. Brake the manoeuvring vehicle.
3. Remove the wheel chocks and release the parking brake.
4. **pneumatic braking system** only:

   4.1 Press the actuator button on the release valve as far as it will go (see page 69).

→ The service brake system is released and the machine can be manoeuvred.

   4.2 Once the manoeuvring procedure is finished, pull out the actuator button on the release valve as far as it will go.

→ The pressure from the air reservoir brakes the trailed sprayer again.

5. Actuate the brakes on the manoeuvring vehicle again once you have finished manoeuvring the machine.
6. Tighten the parking brake again and secure the machine against rolling with wheel chocks.
7. Uncouple the machine and manoeuvring vehicle.

9 Transportation

- During transportation, follow the instructions given in the section "Safety instructions for the operator", page 31.
- Before moving off, check:
  - that the supply lines are connected correctly.
  - the lighting system for damage, proper operation and cleanliness,
  - the braking and hydraulic systems for obvious defects.
  - that the parking brake is completely released
  - the function of the brake system

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact when making interventions in the machine, through unintentional machine movements.

- On foldable machines, check that the transport locks are correctly locked.
- Secure the machine against unintentional movements before starting transportation.

WARNING

Risk of crushing, cutting, being caught and/or drawn in, or impact from tipping and insufficient stability.

- Drive in such a way that you always have full control over the tractor with the attached machine.

  In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the connected machine.

WARNING

Risk of breaking during operation, insufficient stability and insufficient tractor steering and braking power from improper use of the tractor.

These risks pose serious injuries or death.

Comply with the maximum load of the connected machine and the permissible axle and drawbar loads of the tractor. If necessary, drive only with a partially filled tank.

WARNING

Risk of falling when riding on the machine, contrary to instructions.

It is forbidden to ride on the machine and/or climb the machine while it is running.

Instruct people to leave the loading site before approaching the machine.

CAUTION

- During transportation, follow the instructions given in the section "Safety instructions for the operator", page 31.
- Transportation while AutoTrail is switched on is prohibited.
- Transportation is prohibited with a locked tractor control unit. As a general rule, put the tractor control unit on the tractor into neutral for transportation.
- **Move the sprayer boom to the transport position and secure mechanically.**

→ If a working width reduction of the outer elements is mounted, unfold it for transporting purposes.

- Use the transport safety catch to secure the induction bowl when it has been swivelled up into its transport position to prevent it from swivelling down again accidentally.
- Use transport locking for locking the raised ladder to prevent it from folding down again accidentally.
- Securing elements engage the catching hooks and secure the ladder in the transport position against unintentional lowering.
- If a boom extension (option) is mounted, move it into the transport position.
- Switch the work lights off during transport to avoid blinding other motorists.

DANGER

Move the steering drawbar/steering axle to the transport position for transportation.

Otherwise there is the risk of the machine tipping over!

10 Using the machine

When using the machine, observe the information in the following sections:

- "Warning symbols and other labels on the machine" starting on page 18 and
- "Safety information for the user", starting on page 29 ff.

Observing this information is important for your safety.

WARNING

Risk of breaking during operation, insufficient stability and insufficient tractor steering and braking power from improper use of the tractor.

Comply with the maximum load of the connected machine and the permissible axle and drawbar loads of the tractor. If necessary, drive only with a partially filled tank.

WARNING

Risk of crushing, cutting, being caught and/or drawn in, or impact through insufficient stability and tipping of the tractor and/or the attached machine.

Drive in such a way that you always have full control over the tractor, whether the machine is attached or unattached.

In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the connected machine.

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through

- **unintentional falling of raised, unsecured machine parts.**
- **unintentional start-up and rolling of the tractor-machine combination.**

Secure the tractor and the machine against unintentional start-up and rolling before eliminating faults on the machine. See page 143.

Wait for the machine to stop before entering the machine danger area.

WARNING

Danger for the operator or third parties from damaged components being ejected due to impermissibly high drive speeds of the tractor universal joint shaft.

Observe the permissible machine drive speed before switching on the tractor universal joint shaft.

WARNING

Risk of being caught and drawn in and danger from foreign objects being caught and thrown out in the danger area of the driven PTO shaft.

- Whenever the machine is used, first check to ensure that the safety devices and guards of the PTO shaft are fully intact and functional.

  Have damaged safety devices and guards of the PTO shaft replaced immediately by a specialist workshop.
- Check that the PTO shaft guard is secured against rotation by the supporting chain.
- Maintain a sufficient safety clearance between you and the driven PTO shaft.
- Direct people out of the danger area of the driven PTO shaft.
- Shut down the tractor engine immediately in case of danger.

WARNING

Risk of accidental contact with crop protection agents / spray liquid.

- Wear personal protective equipment
  - when preparing the spray liquid.
  - when cleaning / replacing the spraying nozzles during spraying operation.
  - for all cleaning work carried out on the field sprayer after spraying operation.
- When wearing the required protective clothing, always observe the manufacturer's instructions, the product information, the user manual, the safety datasheet or the operating manual for the crop protection agent to be used. For example, use:
  - Chemical-resistant gloves
  - Chemical-resistant overalls
  - Water-resistant footwear
  - A face mask
  - Breathing apparatus
  - Safety glasses
  - Skin protection agents, etc.

WARNING

Risk to health from accidental contact with crop protection agents or spray liquid.

- Put on protective gloves before
  - using crop protection agent,
  - carrying out work on a contaminated field sprayer or
  - cleaning the field sprayer.
- Wash the gloves with clear fresh water from the fresh water tank
  - immediately after contact with crop protection agent.
  - before removing the gloves.

- To use AutoTrail, open the stop tap on the hydraulic cylinder.

10.1 Preparing for spraying operation

- The field sprayer must be operating properly in order to guarantee correct application of the crop protection agent. Have the field sprayer tested regularly on a test rig. Rectify any deficiencies immediately.
- Make sure of using the correct filter equipment, see page 94
- Clean the field sprayer thoroughly before spreading a different crop protection agent.
- Flush the nozzle line before:
  - each time changing a nozzle.
  - before rotating the multiple-nozzle head to another nozzle.

  See the section on "Cleaning", page 188
- Fill the flushing water tank and the clear water tank.

10.2 Preparing the spray liquid

WARNING

Risk of accidental contact with crop protection agent and / or spray liquid.

- Always introduce the crop protection agent into the spray liquid tank using the induction bowl.
- Swivel the induction bowl into the filling position before pouring in the crop protection agent.
- Observe all safety regulations concerning physical protective equipment and breathing apparatus to be used when handling crop protection agents and preparing the spray liquid described in the instructions for use of the crop protection agent.
- Do not prepare the spray liquid in the vicinity of wells or surface water.
- Avoid leaks and contaminations involving crop protection agents and/or spray liquids by taking proper care and by wearing the appropriate physical protection equipment.
- To avert risks to third parties, do not leave any prepared spray liquid, unused crop protection agent, as well as used crop protection agent canisters and the used field sprayer unattended.
- Protect contaminated crop protection agent canisters and the contaminated field sprayer from precipitation.
- During and after preparing the spray liquid, provide for sufficient cleanliness to keep contamination risks as low as possible (e.g. thoroughly wash used gloves before removing them and dispose of the washing water and cleaning fluid in the proper manner).

- The prescribed water and agent spray rate can be found in the directions for use of the crop protection agent.
- Please read intently the directions for use of the agent and observe the specified precautions!

WARNING

Danger for people and animals from accidental contact with the spray liquid while filling the spray liquid tank!

- Wear personal protective equipment when handling crop protection agents or dumping spray liquids from the spray liquid tank. The type of personal protective equipment required is described in the manufacturer's instructions, the product information, the directions for use, the safety data sheet or the user manual for the crop protection agent in question.
- Never leave the field sprayer unattended while filling.
  - Never fill the spray liquid tank beyond the nominal volume.
  - When filling the spray liquid tank, never exceed the permissible load of the field sprayer. Pay attention to the respective specific weight of the liquid in question.
  - While filling, keep watch on the fill level indicator to avoid overfilling the spray liquid tank.
  - While filling the spray liquid tank, pay particular attention to the sealed surfaces; no spray liquid must be allowed to get into the sewerage system.
- Before each filling, check the field sprayer for damage, e.g. for leaking tanks and hoses, as well as for the correct positioning of all control elements.

While filling, pay attention to the permissible load capacity of your field sprayer. Always take the differing specific weights [kg/l] for the individual liquids into account while filling your field sprayer.

Specific weights of different liquids

Liquid	Water	Urea	UAN	NP solution
Density [kg/l]	1	1.11	1.28	1.38

Control terminal:

In the **control terminal**, call up the filling display from the Job menu.

- As it is difficult to dispose of residues in an environmentally-friendly manner, carefully calculate the required filling quantity or refill quantity to avoid leaving any residue at the end of the spraying operation.
  - To calculate the required refill quantity for final filling of the spray liquid tank, use the "Filling table for remaining spray area". To do this, subtract the technical, undiluted residue in the sprayer boom from the calculated refill quantity!

    Refer to the section "Filling table for remaining areas".

Procedure

1. Determine the required water and agent spray rate by consulting the directions for use of the crop protection agent.
2. Calculate the filling quantity or refill quantity for the area to be treated.
3. Fill the machine and blend in the agent.
4. Agitate the spray liquid before commencing spraying operations in accordance with the instructions of the spraying agent manufacturer.

Fill the machine preferably using a suction hose and blend in the agent while filling.

The induction area is thereby flushed with water constantly.

- During the filling process, start blending in the agent once the tank filling level has reached more than 20%.
- When using more than one agent:
  - Clean the canister immediately after each induction of an agent.
  - Flush the induction port after each induction of an agent.

- When filling, no foam must escape from the spray liquid tank.

  The addition of a froth-inhibiting agent also prevents the spray liquid tank from frothing over.

The agitators normally remain switched on from the initial filling to the end of the spraying operation. The instructions of the agent manufacturer, however, have priority.

- With the agitator running, feed the water-soluble plastic film bag directly into the spray liquid tank.
- Before spraying, fully dissolve the urea by circulating the liquid. When dissolving large quantities of urea, the temperature of the spray liquid falls more sharply; the urea consequently dissolves more slowly. The warmer the water, the faster and more completely the urea can dissolve.

- Carefully wash the empty agent canisters, render them unusable, collect and dispose of them in a proper manner. Do not reuse them for other purposes.
- If only spray liquid is available for washing the agent canisters, first use this to carry out preliminary cleaning. Then wash them meticulously when clear fresh water is available, e.g. before preparing the next load for the spray liquid tank or when diluting the residue from the last load.
- Carefully wash out the empty agent tank (e.g. using canister flushing) and add the flushing water to the spray liquid!

To prevent limescale, the degree of hardness of the water may not exceed 14°dH (German degrees of hardness)!

10.2.1 Calculating the filling and refill quantity

To calculate the required refill quantity for the final filling of the spray liquid tank, use the "Filling table for remaining spray area", page 118.

Example 1:

The following are given factors:

Tank nominal volume	1000 l
Residue in the tank	0 l
Water consumption	400 l/ha
Agent required per ha	
Agent A	1.5 kg
Agent B	1.0 l

Question:

How many litres of water, how many kg of Agent A and how many litres of Agent B must be used to treat a surface of 2.5 ha in area?

Answer:

Water:	400 l/ha	x	2.5 ha	=	1000 l
Agent A:	1.5 kg/ha	x	2.5 ha	=	3.75 kg
Agent B:	1.0 l/ha	x	2.5 ha	=	2.5 l

Example 2:

The following are given factors:

Tank nominal volume	1000 l
Residue in the tank	200 l
Water consumption	500 l/ha
Recommended concentration	0.15 %

Question 1:

How many litres or kg of agent are needed to fill the tank?

Question 2:

How large is the area to be treated in ha if a residue of 20 l remains in the tank after spraying?

Formula and answer to Question 1:

$$\frac{\text{Refill amount of water [l] x concentration [\%]}}{100} = \text{Addition of agent [l or kg]}$$

$$\frac{(1000 - 200)\ [l] \times 0.15\ [\%]}{100} = 1.2\ [l \text{ or } kg]$$

Formula and answer to Question 2:

$$\frac{\text{Quantity of liquid available [l]} - \text{residue [l]}}{\text{Water consumption [l/ha]}} = \text{Area to be treated [ha]}$$

$$\frac{\text{1000 [l] (tank nominal volume)} - \text{20 [l] (residue)}}{\text{500 [l/ha] water consumption}} = \text{1.96 [ha]}$$

10.2.2 Filling table for remaining spray area

To calculate the required refill quantity for the final filling of the spray liquid tank, use the "Filling table for remaining spray area".

The specified refill quantities apply for a spray rate of 100 l/ha. For other spray rates, the refill quantity increases by a multiple.

Dis-tance [m]	Working width [m]													
	15	16	18	20	21	24	27	28	30	32	33	36	39	40
	Refill quantity [l]													
10	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**4**	**4**	**4**
20	**3**	**3**	**4**	**4**	**4**	**5**	**5**	**6**	**6**	**6**	**7**	**7**	**8**	**8**
30	**5**	**5**	**5**	**6**	**6**	**7**	**8**	**8**	**9**	**10**	**10**	**11**	**11**	**12**
40	**6**	**7**	**7**	**8**	**8**	**10**	**11**	**11**	**12**	**13**	**13**	**14**	**15**	**16**
50	**8**	**8**	**9**	**10**	**11**	**12**	**14**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
60	**9**	**10**	**11**	**12**	**13**	**14**	**16**	**17**	**18**	**19**	**20**	**22**	**23**	**24**
70	**11**	**11**	**13**	**14**	**15**	**17**	**19**	**20**	**21**	**22**	**23**	**25**	**27**	**28**
80	**12**	**13**	**14**	**16**	**17**	**19**	**22**	**22**	**24**	**26**	**26**	**29**	**30**	**32**
90	**14**	**15**	**16**	**18**	**19**	**22**	**24**	**25**	**27**	**29**	**30**	**32**	**34**	**36**
100	**15**	**16**	**18**	**20**	**21**	**24**	**27**	**28**	**30**	**32**	**33**	**36**	**38**	**40**
200	**30**	**32**	**36**	**40**	**42**	**48**	**54**	**56**	**60**	**64**	**66**	**72**	**74**	**80**
300	**45**	**48**	**54**	**60**	**63**	**72**	**81**	**84**	**90**	**96**	**99**	**108**	**114**	**120**
400	**60**	**64**	**72**	**80**	**84**	**96**	**108**	**112**	**120**	**128**	**132**	**144**	**152**	**160**
500	**75**	**80**	**90**	**100**	**105**	**120**	**135**	**140**	**150**	**160**	**165**	**180**	**190**	**200**

Fig. 136

10.2.3 Fill the spray liquid tank via the suction port and blend in the agent at the same time

Preferably perform the filling from a suitable container and not from an open water access point.

1. Connect the suction hose to the filling connection and water access point.
2. Move suction chest lever **G** to position .
3. Move the pressure gauge switch tap **A** to position .
4. Open switch tap **L**.
5. Set the setting tap main agitator **H** to the maximum position.

If the filling time is not enough for blending in the agent, the filling speed can be reduced by means of setting tap **H**, starting at a filling level of 500 l.

6. Activate the pump (at least 400 min^{-1}) and fill the tank.
7. Start blending in the agent when more than 20% of the tank filling level has been reached.

Blending in the agent:

(Blending in the agent via ECO-Fill, see page 166.)

8. Open the induction bowl lid.
9. Close switch tap **L**.
10. Move the pressure gauge switch tap **A** to position .
11. Open switch tap **D**
12. Move switch tap **E** to position .
13. Move switch tap **F** to position .

While blending in the agent, the supply of water and the suction speed can be adjusted using switch taps **E** and **F**.

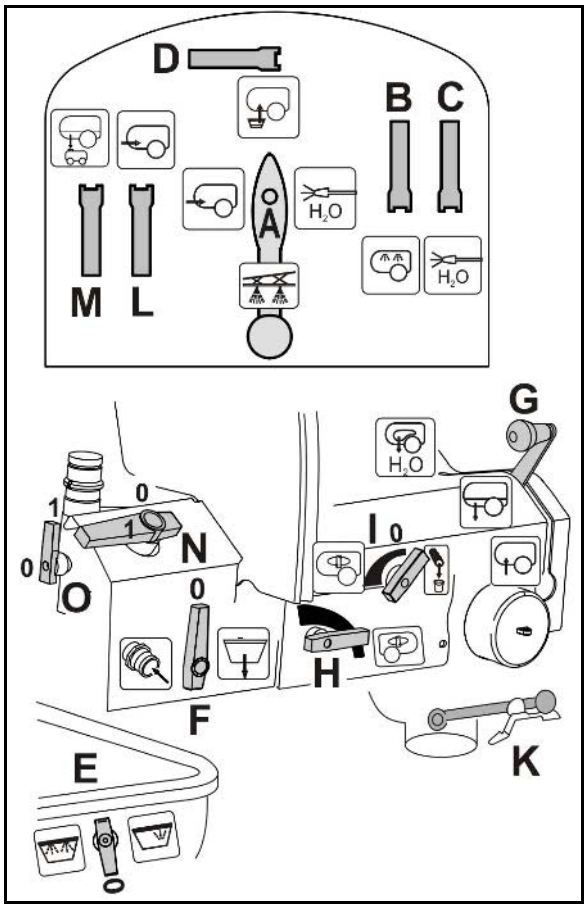


Fig. 137

14. Pour the quantity of agent calculated and measured for filling the tank into the induction bowl.

→ The content of the induction bowl is evacuated.

To increase the user's protection, for example when handling powder agents, first pour the agent into the induction bowl (maximum 50 l), close the lid, and only then

switch tap **F** to position and

switch tap **E** to position .

Rinse the canister:

15. Wash the canister or other containers using the canister flushing.
16. Move switch tap **E** to position .
17. Press the canister down for at least 30 secs.

→ The canister is rinsed with water.

18. Move switch tap **E** to position **0** and remove the canister.
19. Move switch tap **F** to position **0**.
20. Close switch tap **D**.

Once the tank has reached the set filling level:

21. Move switch tap **G** to position .
22. Decouple the suction hose from the filling connection.

→ The suction hose is still filled with water.

23. Set the setting tap main agitator **H** again to a medium position.

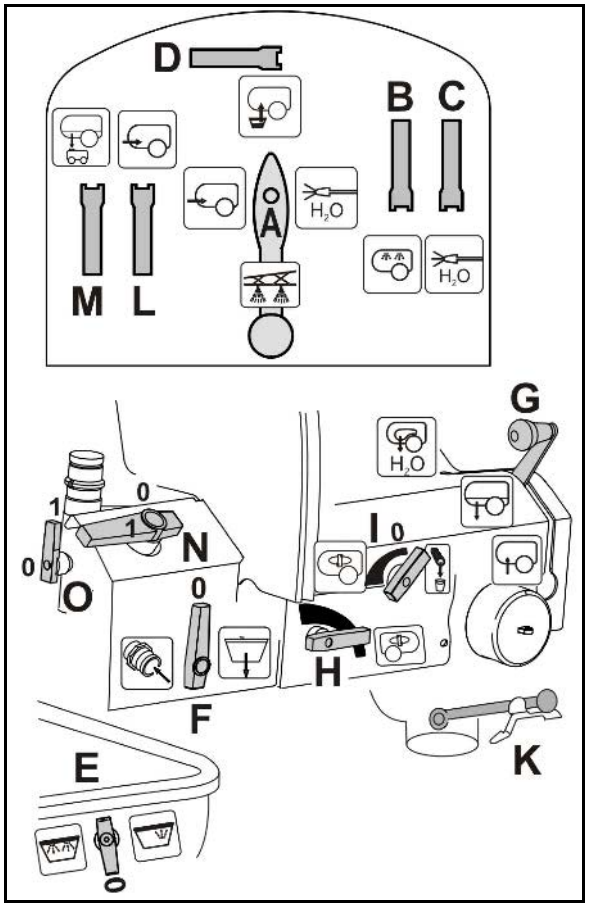


Fig. 138

Increasing the suction power by cutting in the injector:

Move switch tap **F** to position .

The injector must not be cut in until the pump has drawn in water.

- The water being sucked via the injector does not flow through the suction filter.
- Comfort equipment with filling stop:
  The additional injector must not be switched on, as the automatic filling stop will not function otherwise.

The total suction power is:
UX 3200 / 4200:
690 l/min.(pumps 420 l/min., injector 270 l/min.).

UX 4200/ 5200 / 6200:
790 l/min.(pumps 520 l/min., injector 270 l/min.).

Filling from open water access points

Follow regulations closely when filling the spray liquid tank from an open water access point with a suction hose.

10.2.4 Adding the agent using ECO-Fill

1. Activate the pump.
2. Couple the ECO-Fill container with ECO-Fill connection.
3. Move the pressure gauge switch tap **A** to position .
4. Move switch tap **D** to open.
5. Move switch tap **E** and **F** to position **0**.
6. Move switch tap **O** to position **1**.

→ Evacuate the ECO-Fill container.

7. Move switch tap **O** to position **0** when the desired quantity has been evacuated from the ECO-Fill container.

Rinsing the ECO-Fill counter:

1. Decouple the hose from the ECO-Fill container and couple it to the flushing foot.
2. Move switch tap **O** to position **1**.

→ The counter is flushed.

3. Move switch tap **O** and **D** back to 0 and disconnect the counter.

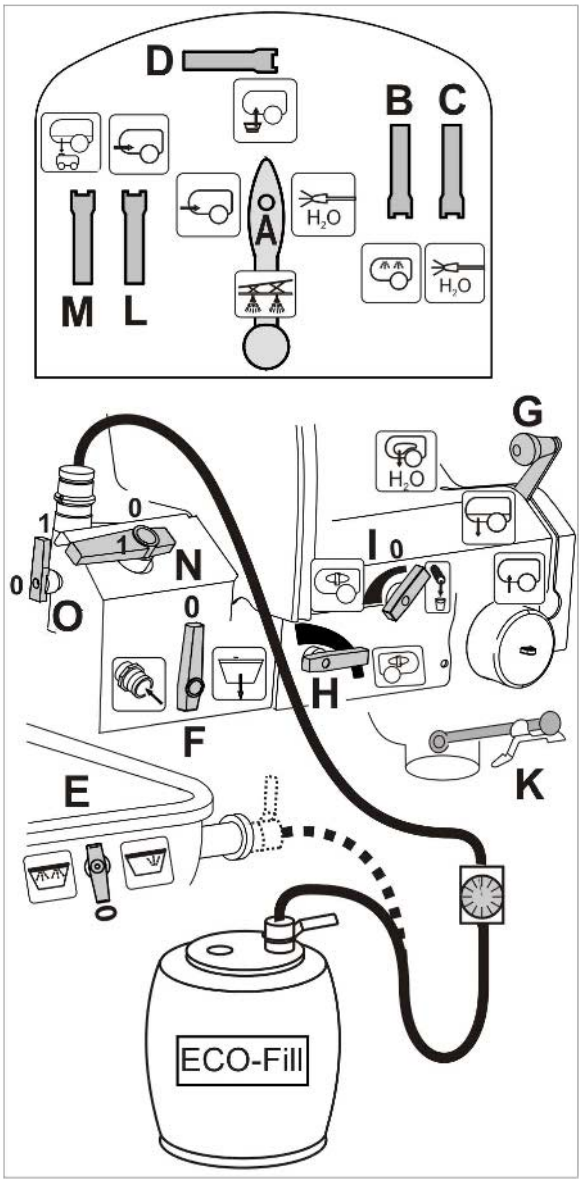


Fig. 139

10.2.5 Filling the spray liquid tank via the filling connection and blending in the agent

(option)

1. Connect the pressure line to the filling connection on the control terminal.
2. Move switch tap **N** to position **1**.
3. Start blending in the agent once 20% of the tank filling level has been reached.

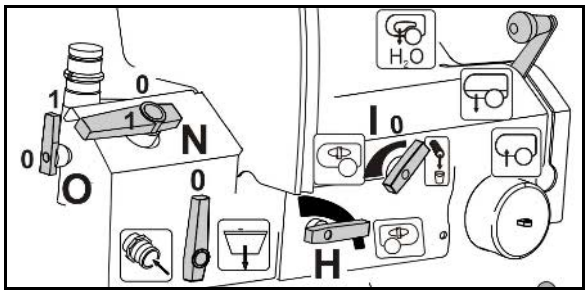


Fig. 140

Blending in the agents:

(Blending in the agent via ECO-Fill, see page 166.)

4. Activate the pump, set the pump speed to 400 rpm and set agitator **H** to a medium position.
   Where necessary, increase the agitating power for a more effective mixing.
5. Manually move suction chest **G** to position .
6. Move the pressure gauge switch tap **A** to position .
7. Open switch tap **D**
8. Open the induction bowl lid.
9. Move switch tap **E** to position .
10. Move switch tap **F** to position
    (The suction power can be adjusted between **0** and opened at maximum).

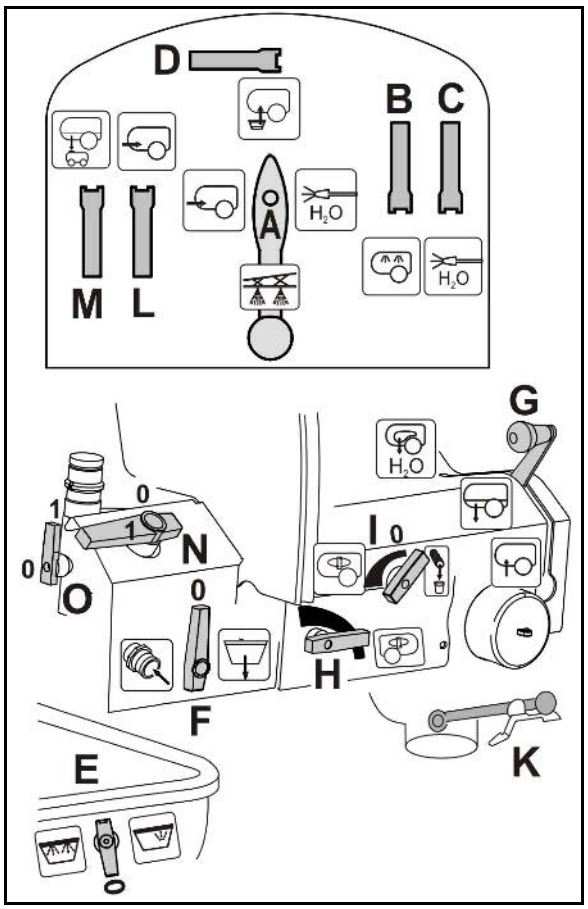


Fig. 141

> While blending in the agent, the supply of water and the suction speed can be adjusted using switch taps **E** and **F**.

11. Pour the calculated and measured quantity of agent for filling the tank into the induction bowl (maximum 50 l).

→ The content of the induction bowl is evacuated.

Rinse the canister:

12. Wash the canister or other containers using the canister flushing equipment.

    Move switch tap **E** to position .

13. Press the canister down for at least 30 secs.

→ The canister is washed with spray liquid.

> To flush a number of canisters, flush them with spray liquid immediately after they are emptied.
>
> Then wash all canisters with flushing water one after another.

14. Manually move suction chest **G** to position .

15. Close switch taps **D** and **H**.

16. Press the canister down for at least 30 secs.

→ **The canister is washed with flushing water.**

> If spray liquid was previously being used, it takes a little time before the flushing water reaches the nozzle.

17. Move switch tap **E** to position **0** and remove the canister.

18. Open switch tap **D**.

> Due to the high consumption of flushing water, keep switch tap **D** open only as long as necessary.

19. Move switch tap **F** to position .

→ The content of the induction bowl is evacuated.

20. Move switch tap **E** to position .

→ The induction bowl is cleaned

21. Move switch taps **E** and **F** to position **0**.

22. Close switch tap **D** again.

23. Move the pressure gauge switch tap **A** to position .

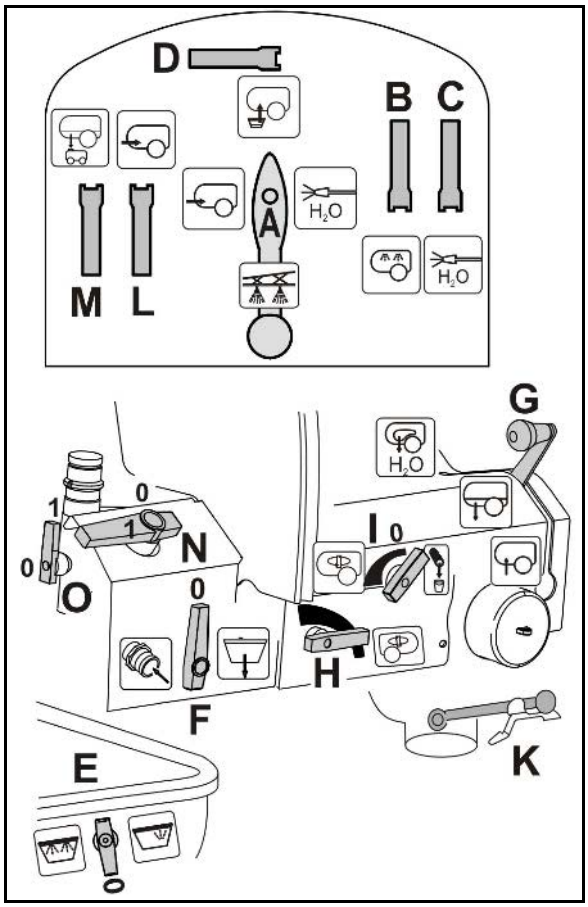


Fig. 142

In order to avoid overfilling, move switch tap **N** to position **0** when reaching 80% of the filling level at the latest.

→ This allows you to clean the canister with no hurry.

Complete filling the spray liquid tank:

24. Move switch tap **N** to position **0**.
25. Decouple the pressure line.

10.3 Spraying operation

Pay attention to the separate operating manual for the control terminal.

Special instructions for spraying operations

- Test the field sprayer by carrying out a calibration:
  - before the start of the season
  - when there are deviations between the actual indicated spray pressure and the spray pressure prescribed in the spray table.
- Before starting to spray, determine the exact spray rate required, referring to the instructions of the crop protection agent manufacturer.

→ Before starting to spray, enter the required spray rate (target rate) in the Control terminal / AMASPRAY+.

- During spraying operations, adhere exactly to the required spray rate [l/ha]:
  - in order to achieve the best possible results from your measure to protect your crop
  - to avoid unnecessary pollution of the environment.
- Select the required nozzle type from the spray table before starting to spray, taking into account:
  - the prescribed operational speed,
  - the required spray rate and
  - the required atomisation characteristic (fine, medium or coarse-dropped) of the crop protection agent used in the crop protection measure.

  Refer to the section "Spray tables for flat-fan, anti-drift, injector and air-mix nozzles", page Seite 181.
- Select the required nozzle size from the spray table before starting to spray, taking into account:
  - the prescribed operational speed,
  - the required spray rate and
  - the targeted spray pressure.

  Refer to the section "Spray tables for flat-fan, anti-drift, injector and air-mix nozzles", page Seite 181.
- Select a low operational speed and a low spray pressure to prevent wastage from windward drift!

  Refer to the section "Spray tables for flat-fan, anti-drift, injector and air-mix nozzles", Seite 181.
- At wind speeds of 3 m/s, take additional drift reduction measures (refer to the section "Measures for drift reduction", page 174)!

- Refrain from use if the average wind speed tops 5 m/s (leaves and thin twigs move).
- To avoid overdosing, switch the sprayer boom on and off only while travelling.
- Avoid overdosing through overlapping, caused by imprecise bout tracking from one spray path to the next and/or when cornering on the headlands with the sprayer boom switched on!
- When increasing operational speed, make sure that the maximum permissible pump drive speed of 550 rpm is not exceeded!
- During spraying operations, constantly check the actual spray liquid consumption in relation to the area treated.
- Calibrate the flow meter if there are any differences between the actual spray rate and displayed spray rate.
- Calibrate the distance sensor (impulses per 100 m) if there are differences between the actual distance covered and the distance displayed.
  See **Control terminal / AMASPRAY+** operating manual.
- If spraying operations must be interrupted because of bad weather, by all means clean the suction filter, the pump, the valve chest and the spray lines. See page **179**.

- Spray pressure and nozzle size influence the droplet size and the volume of liquid sprayed. The higher the spray pressure, the smaller the droplet diameter of the spray liquid. The smaller droplets are more easily subject to increased, undesirable drifting!
- If the spray pressure is increased, the spray rate also increases.
- If the spray pressure is decreased, the spray rate also decreases.
- If the operational speed is increased while the nozzle size and spray pressure remain constant, the spray rate decreases.
- If the operational speed is decreased while the nozzle size and the spray pressure remain constant, the spray rate increases.
- Operational speed and pump drive speed can be selected within broad limits, owing to the automatic, area-based spray rate control via the **control terminal / AMASPRAY+.**

- The pump delivery capacity is dependent on the pump drive speed. Select a pump speed (between 400 and 550 rpm.) that always allows for an adequate flow rate to the sprayer boom and the agitator. When selecting, always take into account that more spray liquid needs to be conveyed at higher operational speeds and higher spray rates.
- The agitator normally remains switched on from the filling stage until the end of spraying operations. The instructions of the agent manufacturer, however, have priority.
- The spray liquid tank is empty when the spray pressure abruptly falls considerably.
- Residues in the spray liquid tank can be applied correctly up to a pressure drop of 25%.
- If the spray pressure drops off while conditions remain otherwise unaltered, the suction or pressure filter are probably blocked.

10.3.1 Applying the spray liquid

- Properly couple the field sprayer to the tractor!
- Before starting to spray, check the following machine data on the control terminal:
  - the values for the permitted spray pressure range of the spraying nozzles installed in the sprayer boom
  - the value "impulses per 100 m"
- Take the appropriate measures if, during spraying operations, a fault message appears on the display.
- Check the displayed spraying pressure during spraying operations.

  Make sure that the spray pressure displayed does not, under any circumstances, deviate by more than ± 25 % from the target spray pressure given in the spray table by changing, for example, the spray rate using the plus / minus buttons. Larger deviations than this from the target spray pressure make it impossible to achieve the best possible results from your crop protection measure and lead to pollution of the environment.

  Decrease or increase the operational speed until you are back within the permissible spray pressure range for the target spray pressure.

Example:

Required spray rate:	200 l/ha
Intended operational speed:	8 km/h
Nozzle type:	LU/XR
Nozzle size:	'05'
Permissible pressure range for the installed spraying nozzles:	min. pressure 1 bar max. pressure 5 bar
Target spray pressure:	3.7 bar
Permissible spray pressure: 3.7 bar ± 25 %	min. 2.8 bar and max. 4.6 bar

1. Prepare and stir the spray liquid correctly in accordance with the instructions from the crop protection agent manufacturer.
2. Manually move suction chest **G** to position .
3. Move the pressure gauge switch tap **A** to position .
4. Switch on agitator **H**, **I**.
   The agitator power can be set variably.
5. Switch on the control terminal.
6. Unfold the sprayer boom.
7. Depending on the nozzles being used, set the working height of the sprayer boom (gap between the nozzles and the crop) according to the spray table.
8. Enter the value for the required spray rate into the control terminal.
9. Activate pump at the pump operating speed.

> At low spray rates, the pump speed can be reduced to save energy.

10. Switch on the sprayers via the control terminal.

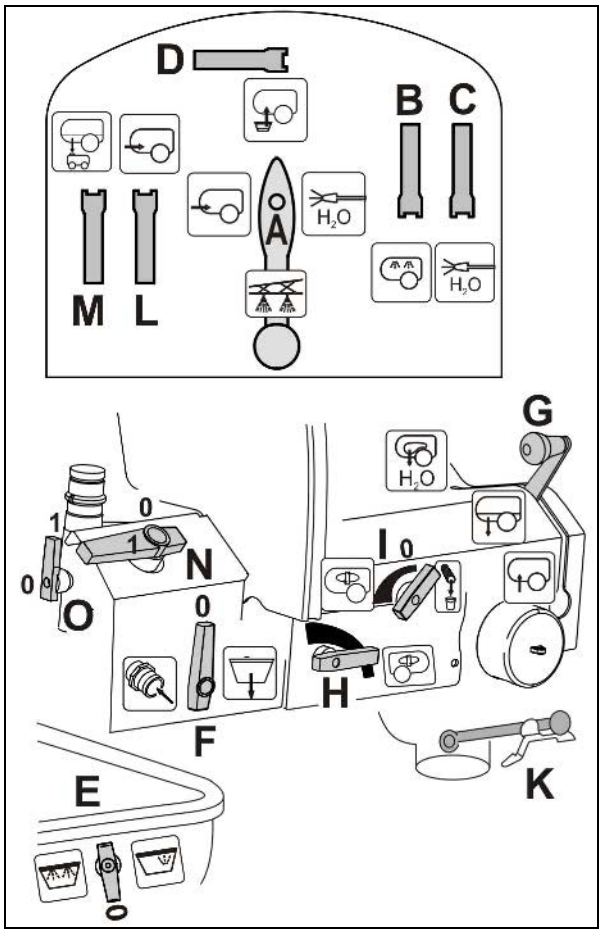


Fig. 143

Driving to the field with the agitator switched on

1. Switch off the control terminal.
2. Switch off the pump drive.
3. Set the desired agitating intensity.

10.3.2 Drift reduction measures

- Reschedule treatment for the early morning or the evening hours (there is generally less wind).
- Choose larger nozzles and a higher water spray rate.
- Reduce spray pressure.
- Precisely maintain the working height of the boom, because the risk of drifting rises very sharply as the distance between the nozzles increases.
- Reduce operational speed (to below 8 km/h).
- Use so-called anti-drift (AD) nozzles or injector (ID) nozzles (nozzles which produce a high proportion of coarse drops).
- Observe the distance requirements of the respective crop protection agent.

10.3.3 Dilute the spray liquid with flushing water

1. Activate the pump, adjust pump speed to 450 rpm.
2. Manually move suction chest **G** to position

.
3. Move the pressure gauge switch tap **A** to position .
4. Close main agitator **H**.
5. Control the flushing water supply using the auxiliary agitator **I**.

Once the desired amount of flushing water has been supplied:

6. Manually move suction chest **G** to position .

10.4 Residues

There are three types of residue:

- excessive residue remaining in the spray liquid tank when the spraying operation is finished

→ This excessive residue is discharged diluted or pumped-out and disposed of.

- the technical residue that remains in the spray liquid tank, the suction chest and the spray line when the spray pressure drops off by 25%

  The suction chest is composed of the suction filter, pump and pressure controller sub-assemblies. Observe the values for the technical residues given on page 118.

→ This technical residue is discharged diluted onto the field while cleaning the field sprayer.

- The final residue that remains in the spray liquid tank, the suction chest and the spray line after being cleaned with air discharge from the nozzles.

→ This final diluted residue is drained off after cleaning.

Disposing of the residues

- Make sure that the residue in the spray line continues to be sprayed in an undiluted concentration. Always spray this residue on an untreated area. The distance needed to use up this undiluted residue can be found in the section "Technical Data - spray lines", page 118. The residue contained in the spray line is dependent on the sprayer boom working width.
- Switch on the agitator for spraying the spray liquid tank empty when the residue in the spray liquid tank is only 5% of the nominal volume. With the agitator switched on, the technical residue increases in comparison to the specified values.
- Measures intended for the user's protection apply when emptying residues. Observe the instructions from the crop protection agent manufacturer and wear appropriate protective clothing.

10.4.1 Diluting the excess residue in the spray liquid tank and spraying out the diluted residue remaining at the end of spraying operations

For machines with comfort equipment, See operating manual for software ISOBUS.

1. Switch the sprayer off on the on-board computer.
2. Activate pump at the pump operating speed.
3. Manually move suction chest **G** to position

.

→ Dilute the excess residue with the tenfold amount of flushing water.

4. Control the flushing water supply using agitator **H**.
5. Once the desired filling level has been reached:

   Manually move suction chest **G** to position
.

6. Move agitator **H, I** to position **0**.
7. Switch on the sprayers on the on-board computer.

→ Where possible, first spray the undiluted spray liquid out of the spray line onto a remaining untreated area.

→ Spray the excess residue onto the already treated area.

→ Keep spreading the diluted residues until only air comes out of the nozzles.

8. Switch off the sprayers on the on-board computer.
9. Clean the field sprayer.

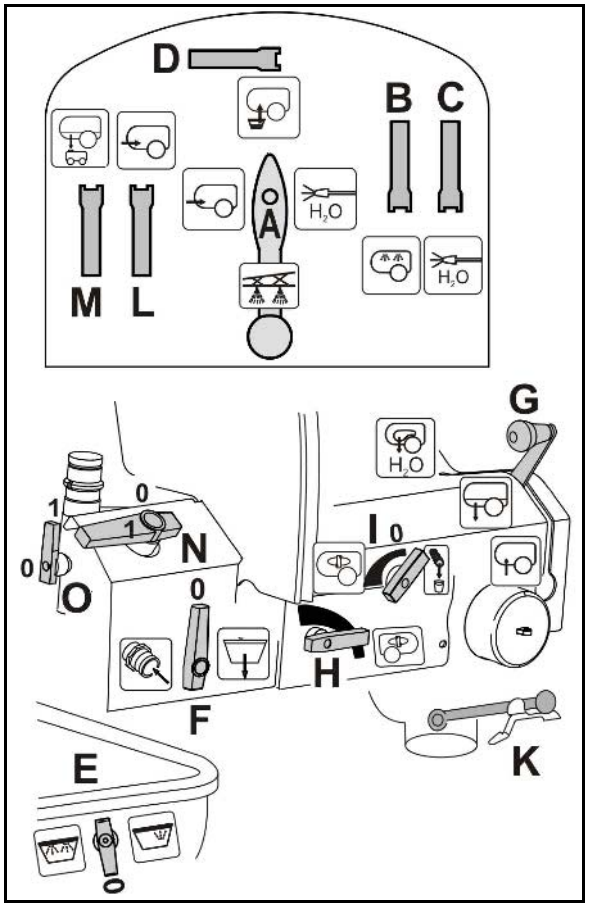


Fig. 144

When spreading residues on already treated areas, observe the maximum permissible spray rate of the agents.

10.4.2 Emptying the spray liquid tank using the pump

1. Connect a suitable drainage hose to the drainage connection on the machine side using a 2 inch Cam Lock Coupling.
2. Move the pressure gauge switch tap **A** to position .
3. Open switch tap **M**.
4. Move suction chest lever **G** to position .
5. Switch off the main agitator **H**.
6. Activate the pump (540 rpm).

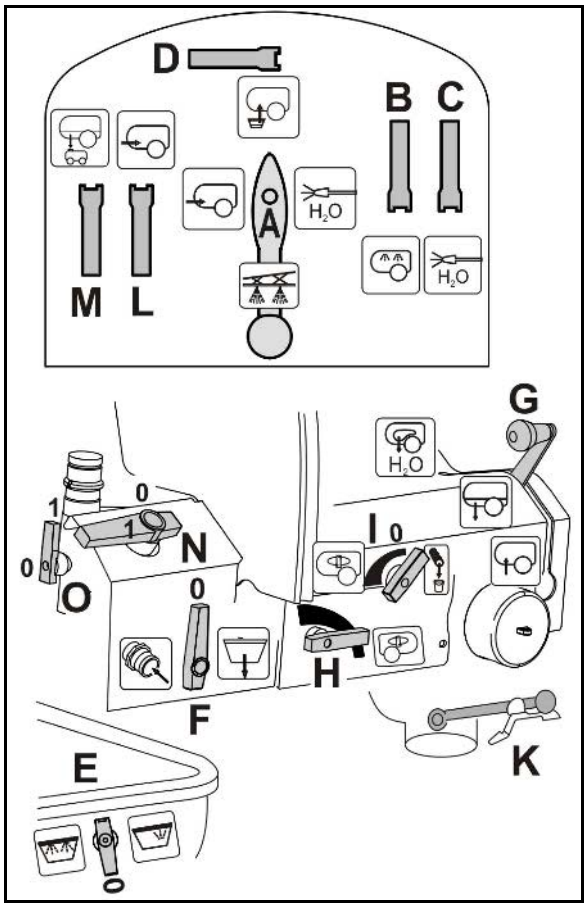


Fig. 145

10.5 Cleaning the field sprayer

- Keep the exposure time as short as possible, for example by daily cleaning of the utensils after the spraying operation is completed. Do not leave the spray liquid in the spray liquid tank for an excessively long period, e.g. overnight.

  The service life and reliability of the field sprayer mainly depend on how long the materials of the field sprayer are exposed to the crop protection agent.
- Clean the field sprayer thoroughly before applying a different crop protection agent.
- Carry out the cleaning process on the field where you last carried out the treatment.
- Carry out the cleaning process using water from the flushing water tank.
- You can carry out the cleaning process in the courtyard if you have a collecting facility installed (e.g. a Biobed).

  Observe all national regulations involved.
- When spreading residues on areas already treated, observe the maximum permissible spray rate of the agents.

For machines with comfort equipment, see operating manual for software ISOBUS.

10.5.1 Cleaning the sprayer with the tank empty

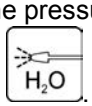
- Clean the spray liquid tank on a daily basis!
- The flushing water tank must be filled completely.
- The cleaning process should be carried out in a threefold reduction procedure.

1. Activate the pump, adjust pump speed to 450 rpm.
2. Manually move suction chest **G** to position .
3. Move the pressure gauge switch tap **A** to position .
4. Open the agitator(s) **H, I** completely.

→ Flush the agitator with 10% of the flushing water supply.

5. Switch off agitator(s) **H, I**.

DUS: Spray lines are flushed automatically. Use 10 % of the flushing water supply for this purpose.

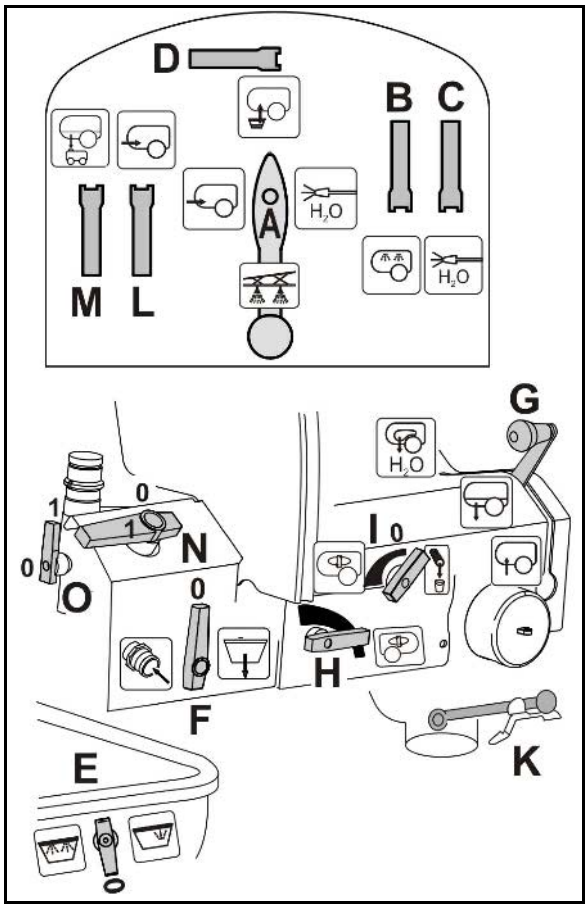
6. Move the pressure gauge switch tap **A** to position  .
7. Open switch tap **B**.

→ Carry out the internal cleaning with 10% of the flushing water supply.

8. Close switch tap **B**.
9. Manually move suction chest **G** to position .
10. Move the pressure gauge switch tap **A** to position .
11. Spread the diluted residues on the area already treated while driving.
12. Switch the sprayer off and back on again several times for a few seconds via the on-board computer.

The valves and the return lines are flushed by this switching on and off.

→ Keep spreading the diluted residues until only air comes out of the nozzles.



Repeat the procedure three times.

Third run:

- Flushing the DUS and agitator is not necessary on the third run.
- Use the rest of the flushing water supply for the internal cleaning.

13. Drain the final residue, see page 180.
14. Clean the suction filter and pressure filter, see page 181, 181.

10.5.2 Draining the final residues

- On the field: Spread the final residues over the field.
- In the courtyard:
  - Place a suitable collecting container under the drain opening of the suction chest and the drain hose for the pressure filter and collect the final residues.
  - Dispose of the collected spray liquid residue in accordance with the corresponding legal guidelines.
  - Collect the spray liquid residues in suitable containers.

1. Switch off the pump.
2. Manually move suction chest **G** to position .
3. Move switch tap **I** to position .
4. Open stop tap **K**.

→ Drain the technical residue.

5. Close switch tap **K** again and move switch tap **I** to position **0**.

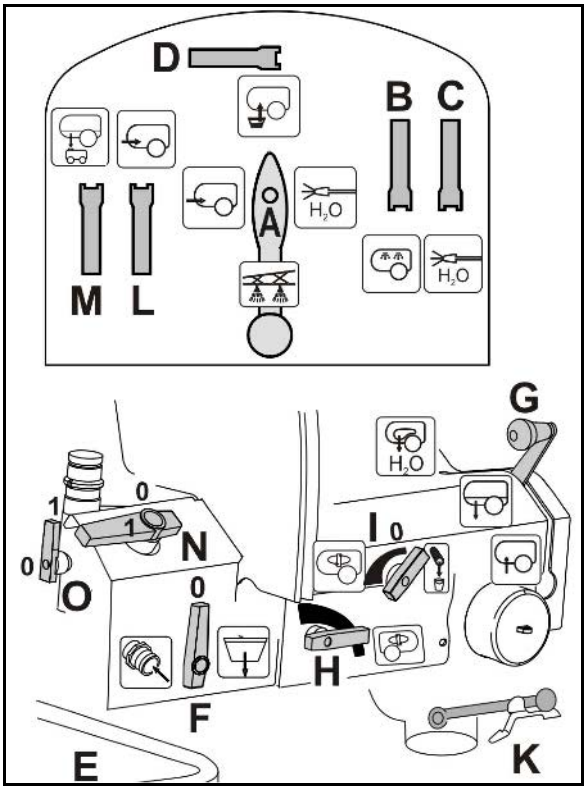


Fig. 146

10.5.3 Cleaning the suction filter when tank is empty

Clean the suction filter (Fig. 147) on a daily basis after cleaning the field sprayer.

1. Unscrew the cover of the suction filter (Fig. 147/2).
2. Remove the cover with suction filter (Fig. 147/3) and clean with water.
3. Reassemble the suction filter in the reverse sequence.
4. Check the filter housing for leaks.

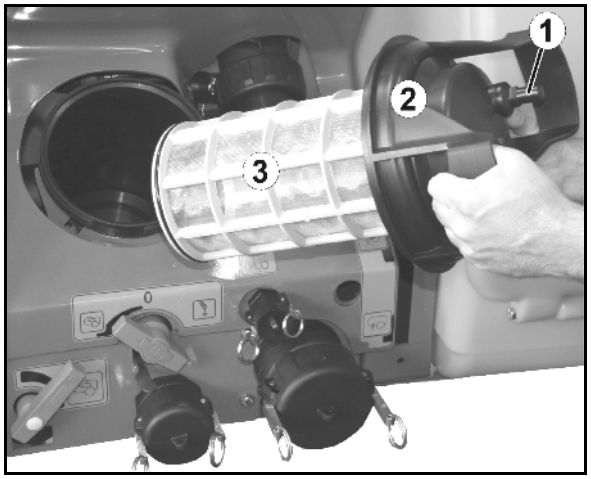
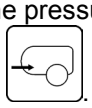


Fig. 147

10.5.4 Cleaning the suction filter when tank is full

1. Activate the pump, adjust pump speed to 300 rpm.
2. Manually move suction chest **G** to position .
   Attention: The Cam Lock Coupling must be mounted on the suction port.
3. Move the pressure gauge switch tap **A** to position  .
4. Open switch tap **L**.
5. Open agitator **H** completely.
6. Unscrew the cover of the suction filter (Fig. 147/2).
7. Activate the relief valve on the suction filter (Fig. 147/1).
8. Remove the cover with suction filter (Fig. 147/3) and clean with water.
9. Reassemble the suction filter in the reverse sequence.
10. Check the filter cover for leaks.

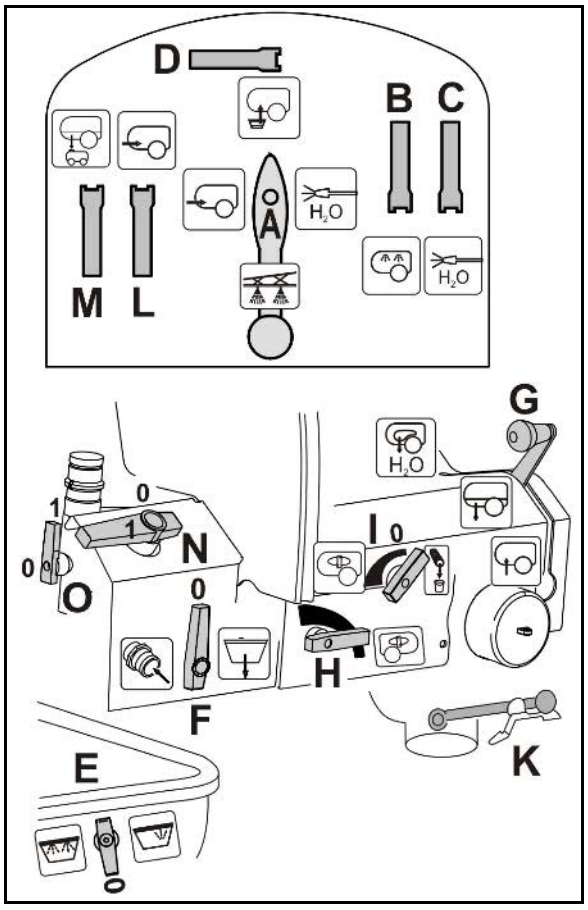


Fig. 148

10.5.5 Cleaning the pressure filter when the tank is empty

1. Undo the sleeve nuts.
2. Remove the pressure filter (Fig. 149/1) and clean with water.
3. Refill the pressure filter.
4. Check the screw connection for leaks.

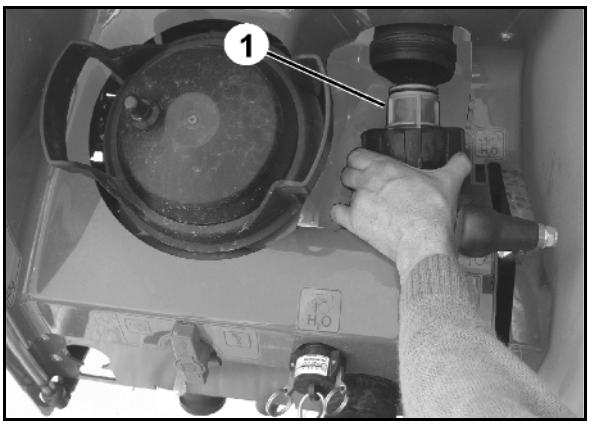


Fig. 149

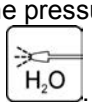
10.5.6 Cleaning the pressure filter when the tank is full

1. Manually move suction chest **G** to position .
2. Move switch tap **I** to position .

→ Drain the residue into the pressure filter.

1. Undo the sleeve nuts.
2. Remove the pressure filter (Fig. 149/1) and clean with water.
3. Refill the pressure filter.
4. Check the screw connection for leaks.
5. Move switch tap **I** to position **0**.

10.5.7 Exterior cleaning

1. Move suction chest lever **G** to position .
2. Move the pressure gauge switch tap **A** to position  .
3. In case no internal cleaning has been previously done:

   Open the switch tap **B** for 30 seconds until flushing water runs out of the nozzles.
4. Open switch tap **C**.
5. Activate the pump.
6. Clean the field sprayer and the sprayer boom with the spray gun.

Following the external cleaning:

7. Close switch tap **C** and
8. Move the pressure gauge switch tap **A** to position .

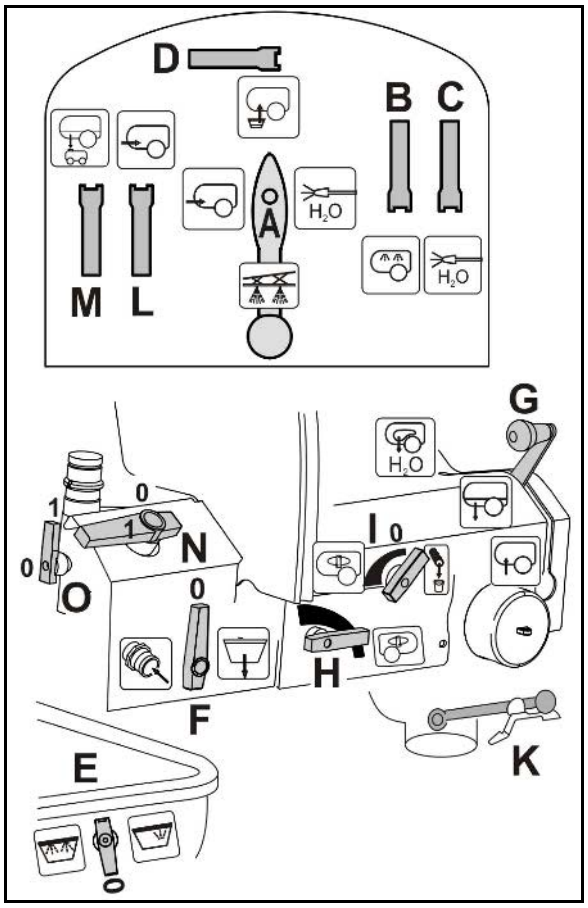


Fig. 150

10.5.8 Cleaning the sprayer during a critical agent change

1. Clean the sprayer in three runs as always, see page 179
2. Fill up the flushing water tank.
3. Clean the sprayer, two runs, see page 179.
4. If the sprayer has been previously filled via the pressure connector:

   Clean the induction bowl using the spray pistol and extract the content of the induction bowl.
5. Drain the final residue, see page 180.
6. By all means, clean the suction filter and pressure filter, see page 181, 181.
7. Clean the sprayer, one run, see page 179.
8. Drain the final residue, see page 180

10.5.9 Cleaning the sprayer with a full tank (work interruption)

If spraying operations must be interrupted because of bad weather, by all means clean the suction chest (suction filter, pumps, pressure controller) and the spray line.

1. Interrupt pump operation.
2. Switch off agitator(s) **H, I**.
3. Manually move suction chest **G** to position

.
4. Activate the pump, adjust pump speed to 450 rpm.

Without nozzle control:

5. Spread at least 50 litres of flushing water over an untreated area while driving.

→ The sprayer is cleaned with flushing water.

- **Tank, agitators are not clean!**
- **The spray liquid concentration in the tank is unchanged.**

With nozzle control:

→ The sprayer is cleaned with flushing water. This is done using two litres of flushing water per metre of working width (observe the filling level).

6. Switch on the sprayers for a short period.

→ The nozzles are flushed.

7. Switch the pump off immediately because the agent concentration drops.

- **Tank, agitators are not clean!**
- **The spray liquid concentration in the tank has changed.**

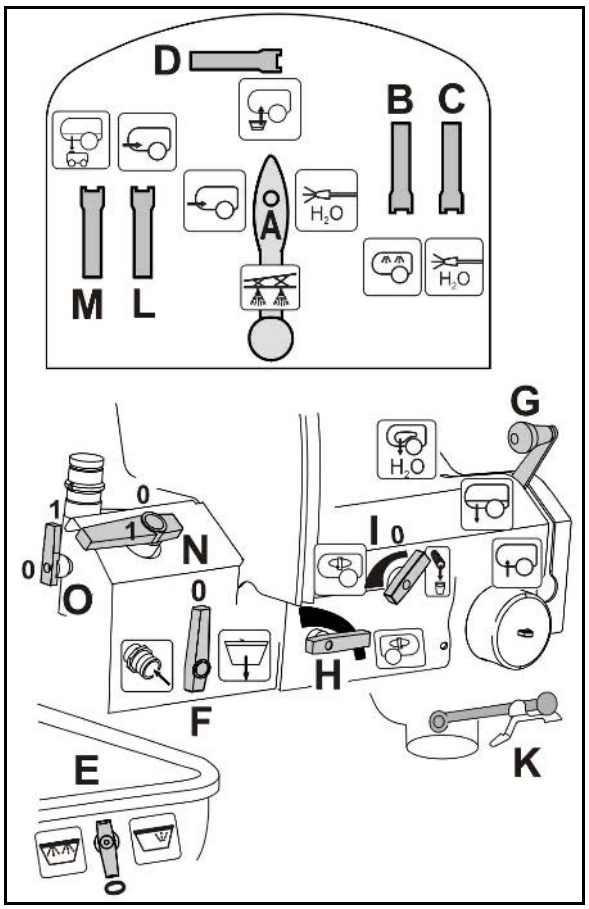


Fig. 151

Continuing the spraying operation

Before continuing with the spraying operation, activate the pump for five minutes at 540 min^{-1} and switch on the agitators completely.

11 Faults

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through

- **unintentional falling of the machine raised using the tractor's three-point linkage.**
- **unintentional falling of raised, unsecured machine parts.**
- **unintentional start-up and rolling of the tractor-machine combination.**

Secure the tractor and the machine against unintentional start-up and rolling before eliminating faults on the machine. See page 143.

Wait for the machine to stop before entering the machine danger area.

Fault	Cause	Remedy
There is no suction from the pump	Blockage on the suction side (suction filter, filter insert, suction hose).	Remove the blockage.
	Pump is sucking in air.	Check the hose connection of the suction hose (optional) on the suction port for leak tightness.
The pump does not have any power	Suction filter and filter insert dirty.	Clean suction filter and filter insert.
	The valves are jammed or damaged.	Change the valves.
	Pump is sucking in air, recognisable from the air bubbles in the spray liquid tank.	Check the hose connections on the suction hose for leak tightness.
The spray cone vibrates	Irregular delivery flow from the pump.	Check, and if necessary replace, the suction and pressure-side valves (see Seite 217).
Oil/spray liquid mixture in the oil filler neck or clearly visible consumption of the oil	Pump diaphragm defective.	Change all six piston diaphragms (see 218).
The required spray rate entered is not achieved	High operational speed; low pump drive speed;	Reduce the operational speed and increase the pump drive speed until the fault message disappears and the audible alarm signal stops
There has been a deviation from the permissible spray pressure range for the nozzle fitted to the sprayer boom	Deviation from the prescribed operational speed, which has an effect on the spray pressure	Alter your operational speed to return to the prescribed operational speed range set for spraying operation

12 Cleaning, maintenance and repair

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through

- **unintentional falling of the machine raised using the tractor's three-point linkage.**
- **unintentional falling of raised, unsecured machine parts.**
- **unintentional start-up and rolling of the tractor-machine combination.**

Secure the tractor and machine against unintentional start-up and rolling, before carrying out cleaning, maintenance or repair work on the machine; see page 143.

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through unprotected danger points.

- Mount protective equipment removed when cleaning, maintaining and repairing the machine.
- Replace defective protective equipment with new equipment.

DANGER

- **When carrying out maintenance and repair, observe the safety instructions, particularly "Field sprayer operation" section, Seite 37.**
- **You may only carry out maintenance or repair work under moving machine parts that are in a raised position if such parts are secured with suitable, positive-fit locking devices against accidental lowering.**

Before each start-up

1. Check hoses/tubes and connection pieces for any visually obvious defects/leaking connections.
2. Repair any areas of chafing on hoses and pipes.
3. Immediately replace worn or damaged hoses and pipes.
4. Immediately repair leaking connections.

- Regular and proper maintenance will keep your trailed sprayer in good condition for a long time, and will prevent early signs of wear. Regular and proper maintenance is a requirement of our warranty conditions.
- Use only genuine **AMAZONE** spare parts (see "Spare and wear parts and aids" section, page 17).
- Use only genuine **AMAZONE** replacement hoses, and hose clamps made of V2A for assembly.
- Specialist knowledge is the requirement for carrying out testing and maintenance operations. This specialist knowledge is not given here in this operating manual.
- Observe environmental protection measures when carrying out cleaning and maintenance work.
- Observe legal requirements when disposing of lubricants, e.g. oils and grease. Also affected by these legal requirements are parts that come into contact with these lubricants.
- Do not exceed a greasing pressure of 400 bar when greasing with high pressure grease guns.
- The following are prohibited:
  - drilling the running gear.
  - drilling through pre-existing holes on the transport frame.
  - welding load-bearing components.
- Protective measures are necessary, such as covering lines or extending lines in particularly critical locations
  - during welding, drilling and grinding work.
  - when working with cut-off wheels near plastic wires and electric wires.
- Clean the field sprayer thoroughly with water before carrying out repair work.
- Carry out repair work on the field sprayer with the pump switched off.
- Thorough cleaning must be carried out before repair work can be carried out inside the spray liquid tank. Keep out of the spray liquid tank.
- Disconnect the machine cable and power supply from the on-board computer when carrying out any cleaning or maintenance work. This applies especially to welding on the machine.

12.1 Cleaning

- Monitor brake, air and hydraulic hose lines particularly carefully
- Never treat brake, air or hydraulic hose lines with benzin, benzene, petroleum or mineral oils.
- Lubricate the trailed sprayer after cleaning, particularly after cleaning with a pressure washer / steam jet, or fat-soluble mediums.
- Observe the statutory requirements for the handling and removal of cleaning agents.

Cleaning with a pressure washer / steam jet

- Always observe the following points when using a pressure washer / steam jet for cleaning:
  - Do not clean any electrical components.
  - Do not clean any chromed components.
  - Never aim the cleaning jet of the cleaning nozzle of the high pressure cleaner/steam jet directly at lubrication points, bearings, rating plates, warning signs, and stickers.
  - Always maintain a minimum jet distance of 300 mm between the pressure washer or steam jet cleaning nozzle and the machine.
  - The set pressure of the high-pressure cleaner / steam jet must not exceed 120 bar.
  - Comply with safety regulations when working with pressure washers.

12.2 Winter storage and long periods out of operation

1. Thoroughly clean the machine prior to overwinter breaks.
   - Cleaning the sprayer with the tank empty, see Page **179**.
   - Draining the final residual amount.
2. Drive the spray pump at low speed and allow the "air to be pumped" once the flushing process has been completed and liquids no longer run out of the spray nozzles.
3. Open stop tap **K**, drain the technical residues of the suction side, switch several times between the different positions on the suction fitting **G** and then close the stop tap **K** again.
4. Move the switch tap **I** in position , drain the technical residue on the pressure side, switch several times between the different positions on the pressure fitting switch tap **A** and then move switch tap **I** back to position **0**.
5. For each sprayer boom part width section, remove a diaphragm valve from a nozzle body to allow the nozzle line to run empty.
6. Switch off the pump drive when liquid no longer runs out of any section of the nozzle line after changing the positions of the suction fitting and the pressure fitting several times.
7. Dismantle and clean the suction filter and the pressure filter.
8. Dismantle the pressure hose of the pump so that the remaining water can flow out of the pressure hose and pressure fitting.
9. Change the positions of the pressure gauge at all positions once again.
10. Actuate the sprayer pump for approx. ½ minute until liquid no longer runs out of the connection on the pressure side of the pump.

Residual amounts can be sprayed out of the pressure connection with high pressure.

11. Cover the pump pressure connection to protect it from dirt.
12. Lubricate the universal joint of the universal joint shaft and grease the profile tubes after longer periods out of operation.
13. Perform an oil change on the pumps before storing for the winter.
14. Drain the hoses on the induction bowl and injector.
15. Empty the flushing water tank by unscrewing the union nut on the outlet.

16. **Super-S boom:** drain the pressure sensor (Fig. 152/1) by removing the hose from the pressure sensor.

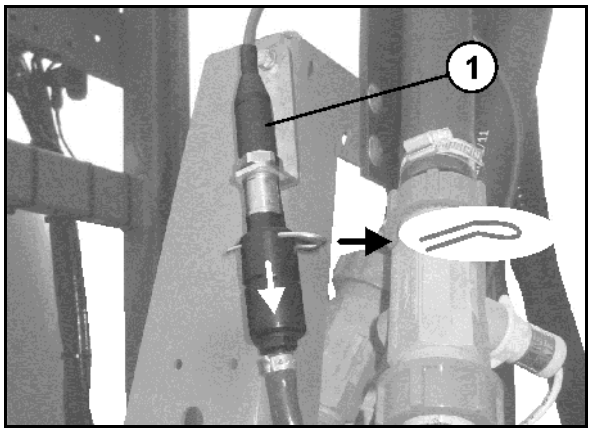


Fig. 152

17. **Super-L boom:** drain the pressure sensor of the boom fitting with the boom lowered by removing the hose from the pressure sensor.

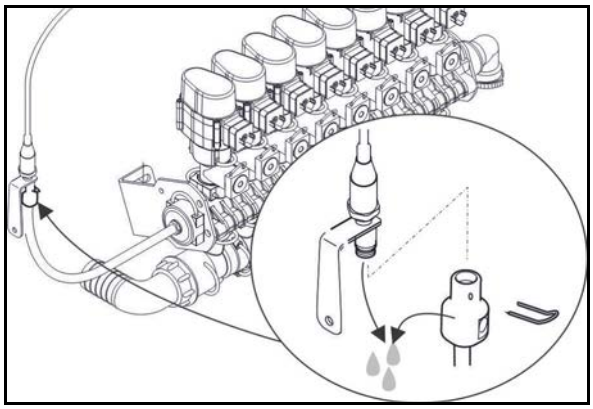


Fig. 153

18. Drain the pressure sensor on the main agitator by screwing off the pressure sensor.

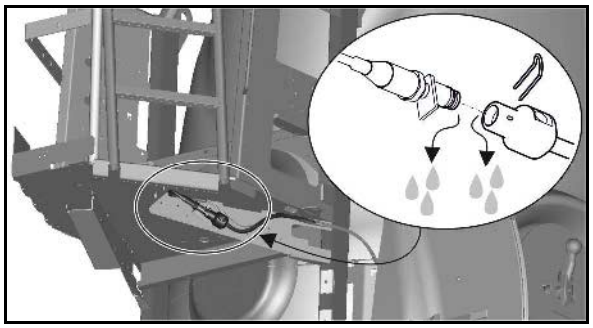


Fig. 154

Before starting up again:

- Install all of the dismantled parts.
- Close the suction port drainage tap.
- At temperatures below freezing, hand crank the piston diaphragm pumps before starting to prevent residual ice from damaging the piston and piston diaphragm.
- Store the pressure gauge and any other electronic accessories in a place where they are safe from frost!

12.3 Lubrication specifications

Lubricate all grease nipples (keep gaskets clean).

Lubricate / grease the machine at the specified intervals.

Lubrication points on the machine are indicated with the foil (Fig. 155).

Carefully clean the lubrication points and grease gun before lubrication so that no dirt is pressed into the bearings. Press the dirty grease out of the bearings completely and replace it with new grease.

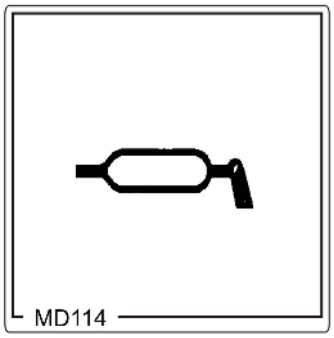


Fig. 155

Lubricants

For lubrication, use a lithium saponified, multipurpose grease with EP additives:

Company	Lubricant designation	
	Normal use conditions	Extreme use conditions
ARAL	Aralub HL 2	Aralub HLP 2
FINA	Marson L2	Marson EPL-2
ESSO	Beacon 2	Beacon EP 2
SHELL	Retinax A	Tetinax AM

12.3.1 Lubrication point overview

	Lubrication point	Interval [h]	Number of lubrication points	Type of lubrication
Fig. 156				
1	Hydraulic cylinder for stand	100	2	Grease nipple
2	Drawbar bearing	50	2	Grease nipple
3	Parking brake	100	1	Grease the cables and guide rollers. Grease the spindle using the grease nipple.
4	Towing eye	50	1	Grease
Fig. 157				
1	Lifting cylinder	100	4	Grease nipple
Fig. 160				
1	Hydraulic cylinder for the hydropneumatic suspension	100	4	Grease nipple
Fig. 161				
	PTO shaft		5	Grease nipple
Fig. 158	**Following steering axle**			
Fig. 159	**Standard axle**			
1	King pin bearing, upper and lower	40		Grease nipple
2	Steering cylinder heads on steering axles	200		Grease nipple
3	Brake shaft bearing, outer and inner	200		Grease nipple
4	Linkage adjuster	1000		Grease nipple
5	ECO-Master automatic linkage adjuster	1000		Grease nipple
6	Renew wheel hub bearing grease, check taper roller bearings for wear	1000		Grease nipple

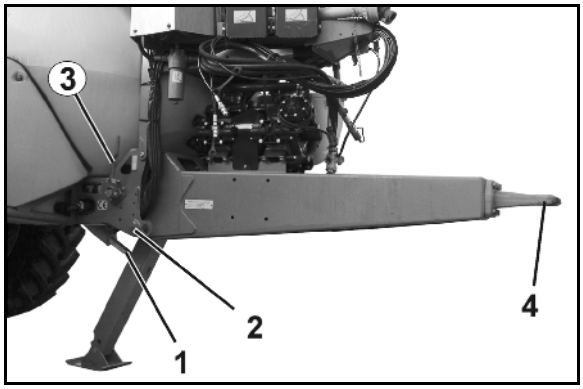


Fig. 156

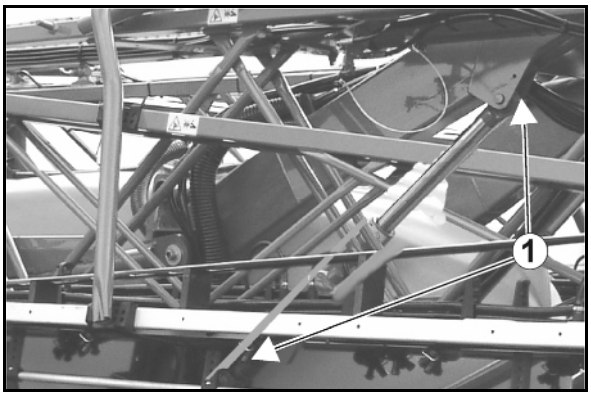


Fig. 157

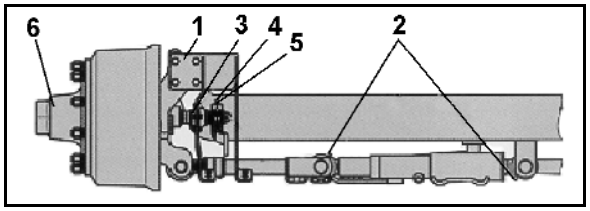


Fig. 158

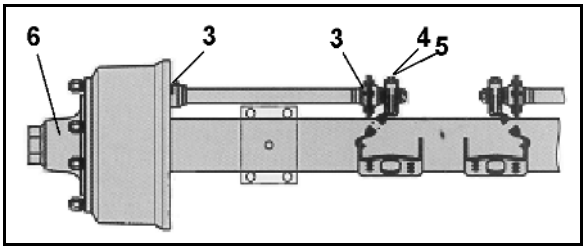


Fig. 159

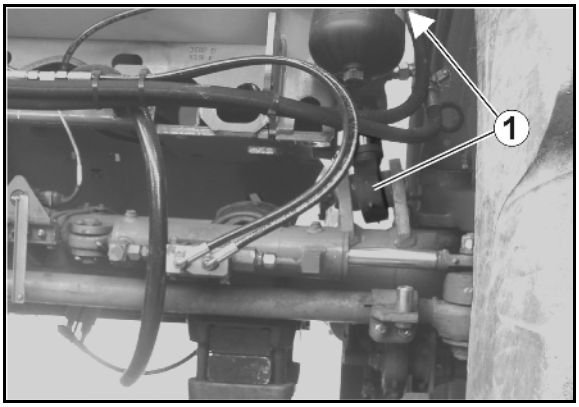


Fig. 160

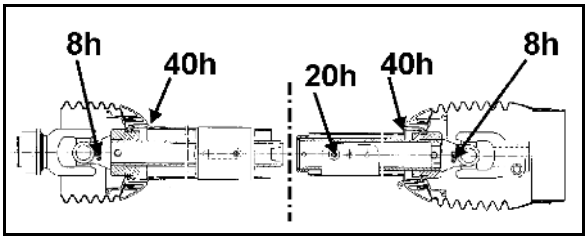


Fig. 161

- For winter operation, grease the protective tubes to prevent them from freezing.
- Also observe the installation and service instructions from the PTO shaft manufacturer, which are fastened to the PTO shaft.

Steering cylinder heads on steering axles

In addition to the lubrication work, you must also make sure that the steering cylinder and the supply line are always bled.

Brake shaft bearing, outer and inner

Caution: no grease or oil should be allowed to get into the brakes. Depending on the model series, the cam bearing for the brakes may not be sealed.

Only use lithium saponified grease with a dropping point greater than 190 °C.

ECO-Master automatic linkage adjuster

Each time the brake linings are replaced:

1. Remove the rubber stopper cap.
2. Apply grease (80 g) until sufficient clean grease escapes at the adjusting screw.
3. Slacken the adjusting screw by approximately one turn with a ring spanner. Actuate the brake lever several times by hand.
4. The automatic readjustment should function smoothly. Repeat several times, as necessary.
5. Refit the stopper cap. Grease again.

Renewing the wheel hub bearing grease

1. Jack up the vehicle securely and release the brakes.
2. Remove the wheels and dust caps.
3. Remove the lynch pin and unscrew the axle nut.
4. Use a suitable extraction device to remove the wheel hub and brake drum, taper roller bearing and sealing elements from the axle stub.
5. Label the removed wheel hubs and bearing cages so that you do not confuse them when refitting.
6. Clean the brakes, check for wear, sound condition and function and replace worn parts.

   The interior of the brake must be kept free from lubricants and dirt.
7. Thoroughly clean the interior and exterior of the wheel hubs. Remove all traces of old grease. Thoroughly clean the bearings and seals (diesel oil) and check for reusability.

   Before refitting the bearings, lightly grease the bearing carrier and then refit all parts in the reverse order. Carefully fit parts with press fits and pipe bushings so that they are not twisted or damaged.

   The bearings, the wheel hub cavity between the bearings and the dust cap must be smeared with grease before fitting. The grease should fill approximately a quarter to a third of the space in the fitted hub.
8. Fit the axle nut and adjust the bearing and brake. Finally, carry out a function check and an appropriate test run and rectify any detected faults.

The wheel hub bearing must only be greased with BPW special longlife grease with a dropping point greater than 190 °C.

The wrong grease or too great a quantity can result in damage.

Mixing lithium-saponified grease with sodium-saponified grease can result in damage caused by incompatibility.

12.4 Maintenance schedule – overview

- **Carry out maintenance work when the first interval is reached.**
- **The times, continuous services or maintenance intervals of any third party documentation shall have priority.**

After the first working run

Component	Maintenance work	see page	Specialist workshop
Wheels	• Wheel nut check	205	X
Hydropneumatic sprung suspension	• Check if the screws are mechanically secure.	206	
Trailer hitch	• Check if the screws are mechanically secure.	206	
Hydraulic hose lines	• Check for leak tightness	207	
Pumps	• Check the oil level	215	

On a daily basis

Component	Maintenance work	see page	Specialist workshop
Fluid filter (Profi-folding)	• Check the clogging indicator	210	
	If necessary, replace		X
Spray liquid tank	• Clean and/or flush	188	
Line filter in the nozzle lines (if present)		223	
Spraying nozzle		222	
Air reservoir for the air brake	• Drain	208	

Every week/ 50 operating hours

Component	Maintenance work	see page	Specialist workshop
Hydraulic hose lines	• Check for defects • Check for leak tightness	207	X
Wheels	• Chec k the air pressure.	205	

Every three months / 200 operating hours

Component	Maintenance work	see page	Specialist workshop
Dual-circuit service brake system	• Check for leak tightness • Check pressure in the air reservoir • Check brake cylinder pressure • Visual inspection of brake cylinder • Joints on brake valves, brake cylinders and brake linkages	203	X
	• Linkage adjuster brake settings	201	X
	• Brake pad check		X
	• Automatic load-dependent brake force regulator (ALB)	204	X
Pumps	• Check belt tension	216	X
Wheels	• Check play on wheel hub bearings	200	X
Line filter	• Clean • Replace damaged filter inserts	223	
Hydropneumatic sprung suspension	• Check if the screws are mechanically secure	206	
Axle holder on the hydropneumatic sprung suspension	• Check the screws for firm seating	206	X
Parking brake	• Check the braking effect with the brake on	204	

Annually / 1,000 operating hours

Component	Maintenance work	see page	Specialist workshop
Pumps	• Oil change every 500 operating hours	215	X
	• Check valves and, if necessary, replace	217	X
	• Check the piston diaphragm and, if necessary replace	218	X
Flow meter and return flow meter	• Calibrate the flow meter • Align the return flow meter	219	
Nozzles	• Calibrate the field sprayer and check the lateral distribution; if necessary, replace worn nozzles	222	
Automatic linkage adjuster	• Brake settings	201	X
	• Check for function		X
Brake drum	• Check for dirt	200	X

As necessary

Component	Maintenance work	see page	Specialist workshop
Super-S boom **Super-L** boom	• Correct the settings	212	
Electric lighting	• Replace defective bulbs	225	
solenoid valves	• Cleaning	210	
Hydraulic throttle valve	• Adjust the actuation speed	212	
Drawbar	• Replace worn parts	198	
Hydraulic plug	• Rinse / exchange the filter in the hydraulic plug	211	

12.5 Drawbars

DANGER

- **Replace damaged drawbars immediately on road safety grounds.**
- **Repairs may only be carried out by the manufacturing factory.**
- **For reasons of safety, performing welding and drilling work on the drawbar is prohibited**

Regularly lubricate the drawbar.

Yoke bar

The pulling eye diameter of the yoke bar, when new, is 40 or 50 mm.

Wear to the pulling eye is permissible; this will increase the pulling eye diameter by up to 1.5 mm.

If wear is greater than this, the wearing bushing on the pulling eye must be promptly replaced.

Hitch drawbar

Wear to the pulling eye is permissible; this will increase the pulling eye diameter by up to 1.5 mm.

If wear is greater than this, the ball point coupling on the eye must be promptly replaced.

12.6 Axle and brake

For optimum brake performance with a minimum of wear, we recommend that the brakes on the tractor are balanced with those on the trailed sprayer. After the service braking system has been run in for a suitable period, arrange for the brakes to be balanced by a specialist workshop.

Have the balancing process carried out before these empirical values are reached if you discover excessive wear on the brake pads.

To avoid problems with the brakes, adjust all vehicles in accordance with EC Directive 71/320 EEC.

WARNING

- **Repair and adjustment work on the service braking system should only be carried out by trained specialist personnel.**
- **Special care is required for welding, torch cutting and drilling work in the vicinity of brake lines.**
- **Always carry out a braking test after any adjusting or repair work on the braking system**

General visual inspection

WARNING

Carry out a general visual inspection of the brake system. Observe and check the following criteria:

- **Pipe lines, hose lines and coupler heads must not be externally damaged or corroded.**
- **Hinges, e.g. on fork heads, must be properly secured, easy to move, and not worn out.**
- **Ropes and cables**
  - **must be properly run.**
  - **may not have any visible cracks.**
  - **may not be knotted.**
- **Check the piston stroke on the brake cylinders, and adjust as necessary.**
- **The air reservoir must not**
  - **move around in the tensioning belts.**
  - **be damaged.**
  - **show any outward signs of corrosion damage.**

Checking the brake drum for dirt

1. Unscrew the two cover plates (Fig. 162/1) on the inside of the brake drum.
2. Remove any dirt and plant debris which may have entered the drum.
3. Refit the cover plates.

CAUTION

Dirt entering the drums may be deposited on the brake pads (Fig. 162/2) and thus die appreciably reduce brake performance.

Risk of accident.

If dirt is discovered in the brake drum, the brake pads must be inspected by a specialist workshop.

For this to happen, the wheel and brake drum must be removed.

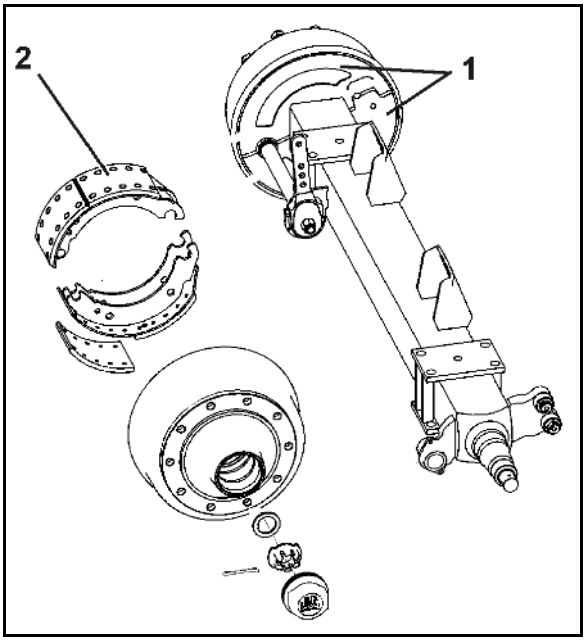


Fig. 162

Checking the play on wheel hub bearings

To check the play on wheel hub bearings, raise the axle until the wheels turn freely. Release the brake. Place a lever between the tyre and the ground and check the play.

If bearing play can be detected:

Adjust the bearing play

- Remove the dust cup or hub cap.
- Remove the split pin from the axle nut.
- Tighten the wheel nut while turning the wheel at the same time until the wheel hub is lightly braked as it turns.
- Turn axle nut back to the next available split pin hole. To the next matching hole (max. 30°).
- Fit split pin and bend slightly open.
- Top up the dust cap with high melting point grease and drive it into, or screw it onto the wheel hub.

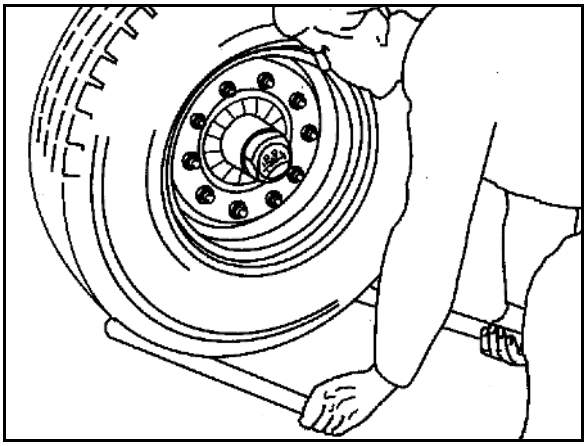


Fig. 163

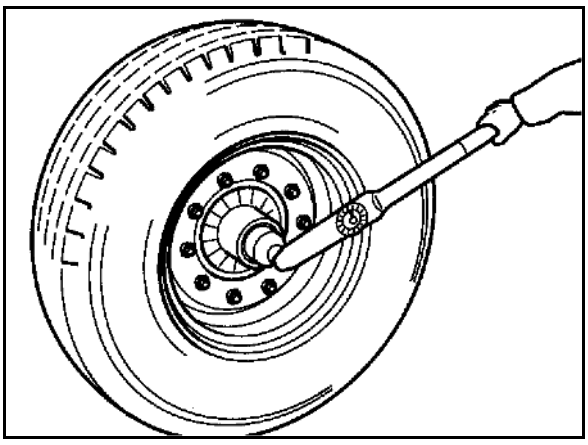


Fig. 164

Brake pad check

Open the inspection hole (Fig. 165/1) by pulling out the rubber stopper (if present).

At a residual thickness

a: for riveted pads 5 mm

(N 2504) 3 mm

b: for adhesive pads 2 mm

the brake pad must be replaced.

Reinsert the rubber tab.

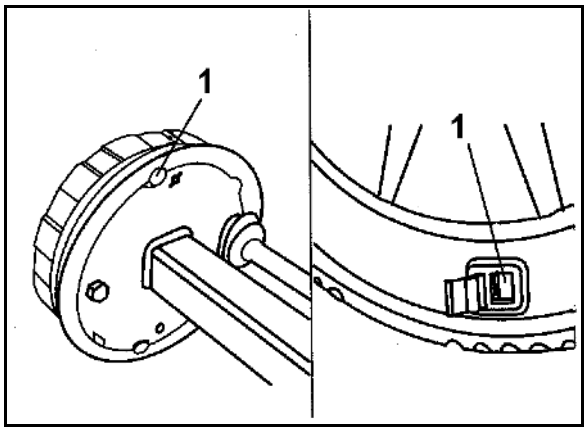


Fig. 165

Brake adjustment

Depending on use, the wear and function of the brakes must be constantly checked and, if necessary, readjustment must be carried out. Readjustment is required after using approx. 2/3 of the max. cylinder stroke for emergency braking. To do this, jack up the axle and secure it against unintended movement.

Adjusting the linkage adjuster

Move the linkage adjuster by hand in the pressure direction. If the free travel of the long-stroke diaphragm cylinder pressure rod is max. 35 mm, the wheel brake must be readjusted.

Adjustments are made using the readjustment hexagon bolt on the linkage adjuster. Set the free travel "a" to 10-12 % of the connected brake lever length "B",
e.g. lever length 150 mm = free travel 15 – 18 mm.

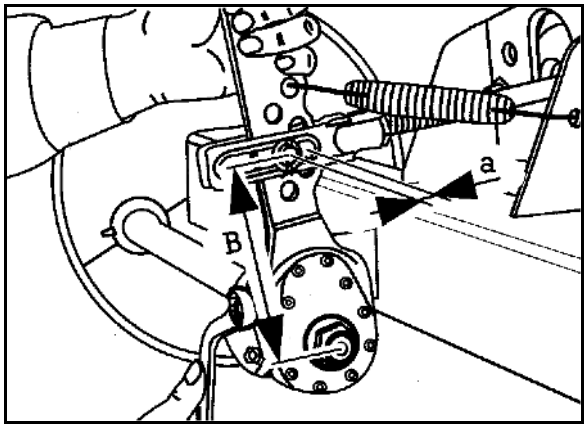


Fig. 166

Adjusting the automatic linkage adjuster

Basic settings are made in the same way as for the standard linkage adjuster. Readjustment occurs automatically at a cam rotation of approx. 15°.

The ideal lever position (which cannot be altered owing to the attachment of the cylinder) is approx. 15° before perpendicularity, and the same in the actuation direction.

Checking the function of the automatic linkage adjuster

1. Remove the rubber stopper cap.
2. Slacken the adjusting screw (arrow) with a ring spanner approx. ¾ of a turn anti-clockwise. There must be a free travel of at least 50 mm for a lever length of 150 mm.
3. Actuate the brake lever several times by hand. This should cause a smooth automatic readjustment; it should be possible to hear the coupling engaging and, on the back stroke, the adjusting screw should turn clockwise slightly.
4. Refit the stopper cap.
5. Lubricate with BPW ECO_Li91 special high melting point grease.

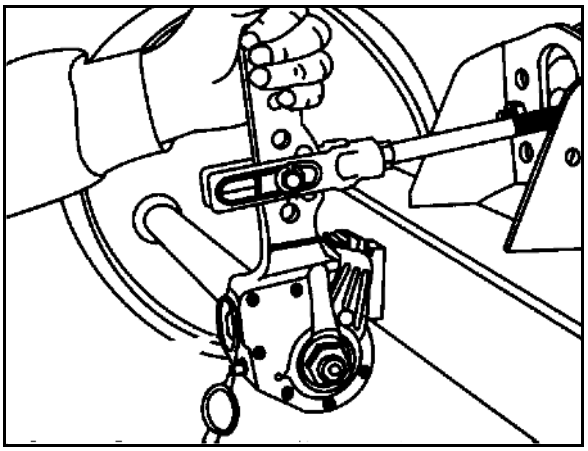


Fig. 167

Air reservoir

Drain the air reservoir every day.

(1) Air reservoir
(2) Tensioning belts
(3) Drainage valve
(4) Test connection for pressure gauge

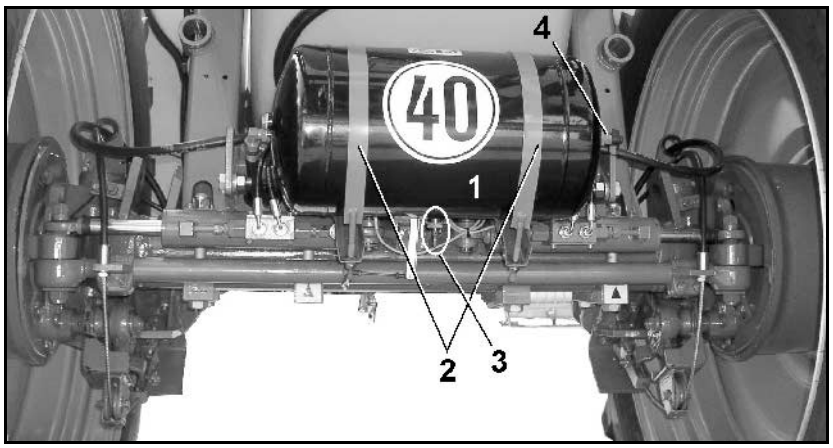


Fig. 168

1. Pull the drain valve in a sideways direction using the ring until no more water escapes from the air reservoir.

→ Water flows out of the drain valve.

2. Unscrew the drain valve from the air reservoir and clean the reservoir if there are signs of dirt.

Inspection instructions for the dual circuit service brake system

1. Leak tightness check

1. Check all connections, pipe lines, hose lines and screw connections for leak tightness.
2. Remedy leakages.
3. Repair any areas of chafing on pipes and hoses.
4. Replace porous and defective hoses.
5. The dual-circuit service brake system may be considered leakproof if the drop in pressure is no more than 0.15 bar after 10 minutes.
6. Seal any leaking areas or replace leaking valves.

2. Checking the pressure in the air reservoir

1. Connect a pressure gauge to the test connection on the air reservoir.

   Set value 6.0 to 8.1 $^{+0.2}$ bar

3. Checking the brake cylinder pressure

1. Connect a pressure gauge to the test connection on the brake cylinder.

   Set value: with brake not applied 0.0 bar

4. Visual inspection of the brake cylinder

1. Check the dust sleeves or gaiters (Fig. 168/5) for damage.
2. Replace damaged parts.

5. Joints on brake valves, brake cylinders and brake linkages

Joints on brake valves, brake cylinders and brake linkages must move freely. Grease or lightly oil, if necessary.

12.6.1 Automatic load-dependent brake force regulator (ALB)

Check the brake pressure:

connect a pressure gauge to the test connection on the brake cylinder.

if the brake pressure deviates from the required values, set the brake pressure on the ALB via the eye bolts.

1. **Container empty: set dimension X until the brake pressure of 3.5 bar is reached.**

- Unscrew the eye bolt.

→ The test pressure reduces

- Screw the eye bolt in

→ The test pressure increases

2. **Container at nominal volume minus 10 to 15 %: set dimension Y until the brake pressure of 6.5 bar is reached.**

- Unscrew the eye bolt

→ The test pressure increases

- Screw the eye bolt in

→ The test pressure reduces

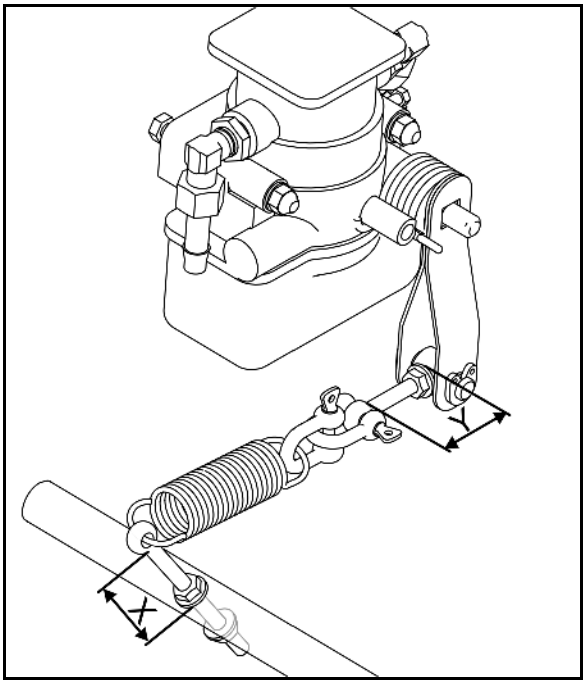


Fig. 169

12.7 Parking brake

On new machines, the brake cables of the parking brake may stretch.

Readjust the parking brake,

- if three quarters of the spindle tensioning distance is required to firmly apply the parking brake.
- if you have just fitted new brake pads.

Adjusting the parking brake

When the parking brake is off, the brake cable must be slightly slack. However, the brake cable must not rest or chafe against other parts of the vehicle.

1. Release the cable clamps.
2. Shorten the brake cable as appropriate and retighten the cable clamps.
3. Check for the correct braking effect from the parking brake when applied.

12.8 Tyres / wheels

- **Required tightening torque for wheel nuts or bolts:**

  510 Nm

- Regularly check the
  - o wheel nuts for firm seating.
  - o tyre pressure (for information on this, see section 12.8.1).
- Only use the tyres and wheels which we have specified (see page 55).
- Repair work on tyres must only be carried out by specialists using suitable assembly tools.
- Tyre fitting requires sufficient skills and proper assembly tools.
- Use the jack only at the jacking points indicated.

12.8.1 Tyre pressures

- The required tyre pressure is dependent on
  - o tyre size.
  - o tyre loading capacity.
  - o speed.
- The operational performance of the tyres is reduced
  - o by overloading.
  - o if tyre pressure is too low.
  - o if tyre pressure is too high.

- Check tyre pressures regularly when the tyres are cold, i.e. before starting a run (see page 55).
- The difference in pressure between the tyres on one axle must be no greater than 0.1 bar.
- Tyre pressure can be raised by up to 1 bar after a fast run or in warm weather. Tyre pressure should on no account be reduced as it is then too low when the tyres cool down.

12.8.2 Fitting tyres

- Remove any instances of corrosion from the wheel rim seating surfaces before fitting a new / another tyre. Corrosion can cause damage to the wheel rims when the vehicle is in operation.
- When fitting new tyres, always use new valves for tubeless tyres or new inner tubes.
- Always fit the valves with valve caps which have a gasket insert.

12.9 Hydropneumatic sprung suspension

Check if the screws are mechanically secure.

Note the specified tightening torque.

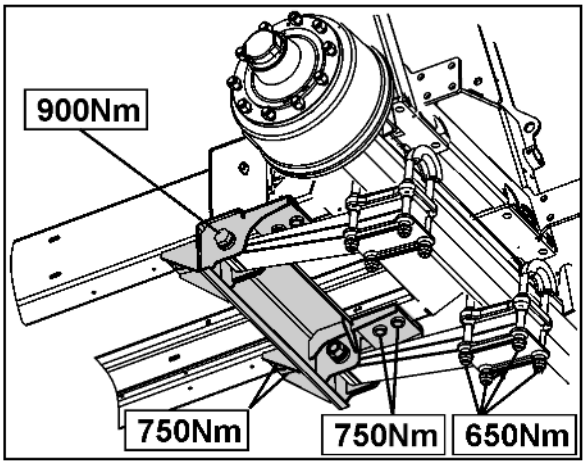


Fig. 170

12.10 Drawbar

Check if the screws are mechanically secure.

Note the specified tightening torque.

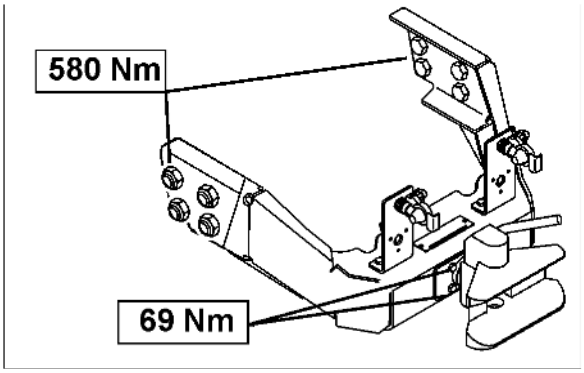


Fig. 171

12.11 Hydraulic system

WARNING

Risk of infection through the high pressure hydraulic fluid of the hydraulic system entering the body.

- Only a specialist workshop may carry out work on the hydraulic system.
- Depressurise the hydraulic system before carrying out work on the hydraulic system.
- When searching for leak points, always use suitable aids.
- Never attempt to plug leaks in hydraulic hose lines with your hand or fingers.

  Escaping high pressure fluid (hydraulic fluid) may pass through the skin and ingress into the body, causing serious injuries.

  If you are injured by hydraulic fluid, contact a doctor immediately. Risk of infection

- When connecting the hydraulic hose lines to the hydraulic system of connected machines, ensure that the hydraulic system is depressurised on both the drawing vehicle and the trailer.
- Ensure that the hydraulic hose lines are connected correctly.
- Regularly check all the hydraulic hose lines and couplings for damage and impurities.
- Have the hydraulic hose lines checked at least once a year by a specialist for proper functioning.
- Replace the hydraulic hose line if it is damaged or worn. Only use genuine AMAZONE hydraulic hose lines.
- The hydraulic hose lines should not be used for longer than six years. This period includes any storage time of a maximum of two years. Even with proper storage and approved use, hoses and hose connections are subject to natural ageing, thus limiting the length of use. However, it may be possible to specify the length of use from experience values, in particular when taking the risk potential into account. In the case of hoses and hose connections made from thermoplastics, other guide values may be decisive.
- Dispose of old oil in the correct way. If you have problems with disposal, contact your oil supplier.
- Keep hydraulic fluid out of the reach of children!
- Ensure that no hydraulic fluid enters the soil or waterways.

12.11.1 Labelling hydraulic hose lines

Valve chest identification provides the following information:

Fig. 172/...

(1) Manufacturer's marking on the hydraulic hose line (A1HF)

(2) Date of manufacture of the hydraulic hose lines (02 04 = February 2004)

(3) Maximum approved operating pressure (210 BAR).

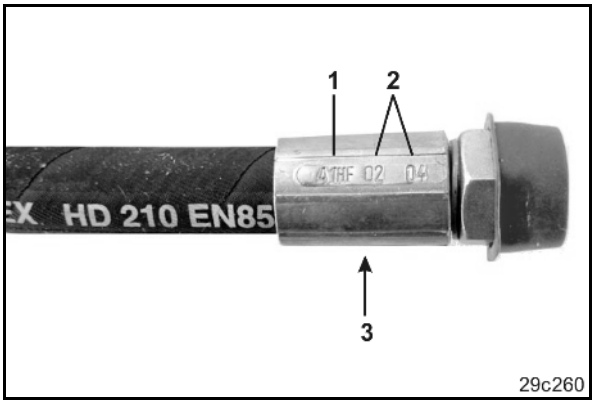


Fig. 172

12.11.2 Maintenance intervals

After the first 10 operating hours, and then every 50 operating hours

1. Check all the components of the hydraulic system for tightness.
2. If necessary, tighten screw unions.

Before each start-up:

1. Check the hydraulic hose lines for visible damage.
2. Repair any areas of chafing on hydraulic hose lines and pipes.
3. Replace any worn or damaged hydraulic hose lines immediately.

12.11.3 Inspection criteria for hydraulic hose lines

For your own safety and in order to reduce pollution, ensure the following inspection criteria.

Replace hoses if the respective hose fulfils at least one of the following criteria:

- Damage to the outer layer up to the ply (e.g. scouring points, cuts, cracks).
- Brittleness of the outer layer (crack formation of the hose material).
- Deformations which do not match the natural shape of the hose. Both in a depressurised and pressurised state or when bent (e.g. layer separation, bubble formation, pinching, bends).
- Leak points.
- Installation requirements not complied with.

- Life span of 6 years has been exceeded.

  The date of manufacture of the hydraulic hose line on the assembly is decisive for determining these six years. If the date of manufacture on the assembly is "2004", then the hose should not be used beyond February 2010. See also "Labelling of hydraulic hose lines".

Common causes for leaking hoses / pipes and connection pieces include:

- missing O-rings or seals
- damaged or badly fitting O-rings
- brittle or deformed O-rings or seals
- foreign bodies
- badly fitting hose clips

12.11.4 Installation and removal of hydraulic hose lines

Use

- only genuine **AMAZONE** replacement hoses. These hoses stand up to chemical, mechanical and thermal loads.
- hose clips made from V2A for fitting hoses, as a rule.

When installing and removing hydraulic hose lines, always observe the following information:

- Ensure cleanliness.
- Always install the hydraulic hose lines to ensure the following in all operating positions
  - o There is no tension, apart from the hose's own weight.
  - o There is no possibility of jolting on short lengths.
  - o External mechanical influences on the hydraulic hose lines are avoided.

    Use appropriate arrangements and fixing to prevent any scouring of the hoses on components or on each other. If necessary, secure hydraulic hose lines using protective covers. Cover sharp-edged components.
  - o The approved bending radii may not be exceeded.

- When connecting a hydraulic hose line to moving parts, the hose length must be appropriate so that the smallest approved bending radius is not undershot over the whole area of movement and/or the hydraulic hose line is not overtensioned.
- Fix the hydraulic hose lines at the specified fixing points. There, avoid hose clips, which impair the natural movement and length changes of the hose.
- The coating of hydraulic hose lines is not permitted.

12.11.5 Fluid filter

- Oil filter for Profi-folding
- Oil filter for hydraulic pump drive

Hydraulic fluid filter (Fig. 173/1) with contamination indicator (Fig. 173/2).

- Green Filter fully functional
- Red Replace filter

To remove the filter, twist off the filter cover and remove the filter.

CAUTION

Beforehand, depressurise the hydraulic system.

Otherwise there is a risk of injury from hydraulic fluid escaping at high pressure.

After replacing the filter, press the contamination indicator back into place.

→ Green ring again visible.

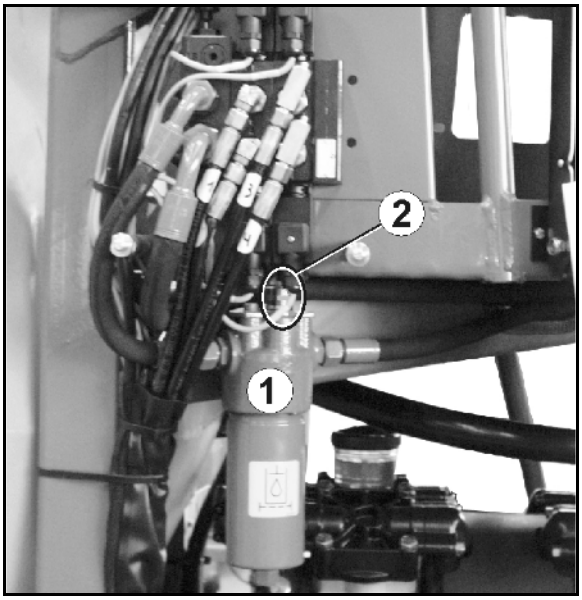


Fig. 173

12.11.6 Cleaning the solenoid valves

- hydraulic block for Profi-folding

To eliminate impurities from the solenoid valves, they must be flushed through. This may be necessary if deposit prevent the slider fully opening or closing.

1. Unscrew the magnetic cap (Fig. 174/1).
2. Remove the solenoid (Fig. 174/2).
3. Unscrew the valve rod (Fig. 174/3) with valve seats and clean with compressed air or hydraulic fluid.

VORSICHT

Risk of injury from hydraulic fluid escaping at high pressure!

Beforehand, depressurise the hydraulic system!

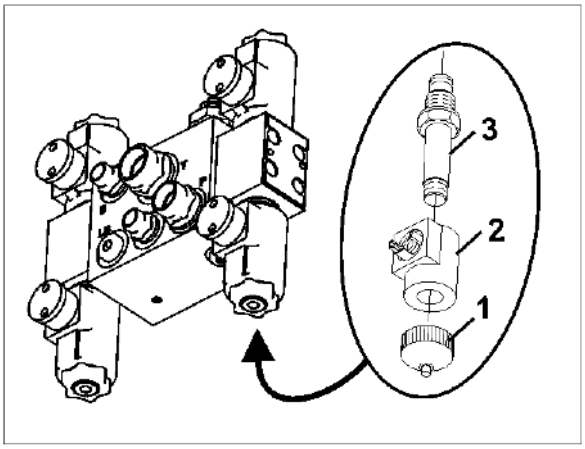


Fig. 174

12.11.7 Clean / exchange the filter in the hydraulic plug

Not with Profi-folding.

The hydraulic plugs are equipped with a filter (Fig. 172/1) that may block and then have to be cleaned / exchanged.

This is the case when the hydraulic functions run slower.

1. Unscrew the hydraulic plug from the filter housing.
2. Remove the filter with compression spring.
3. Clean / exchange the filter.
4. Re-fit the filter and compression spring correctly.
5. Screw back on the hydraulic plug. In doing so, observe the correct seating of the O-ring seal.

CAUTION

Danger of injuries from escaping hydraulic oil at high pressure!

Work on the hydraulic system only in a depressurized state.

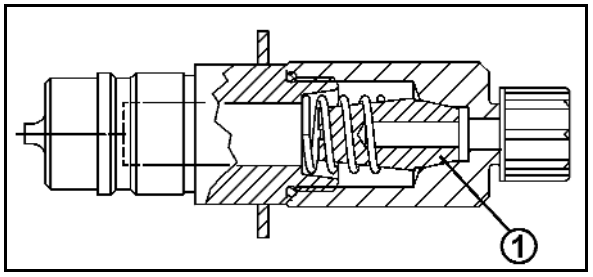


Fig. 175

12.11.8 Adjusting the hydraulic throttle valve

The operating speeds for the individual hydraulic functions are set at the factory from the valve block using the respective hydraulic throttle valves (fold/unfold sprayer boom, lock/unlock the swing compensation, etc.). However, depending on the type of tractor, it may be necessary to correct these speed settings.

The operating speed for a hydraulic function associated with a particular throttle pair can be adjusted by screwing the hexagon socket head screw on the corresponding throttle in or out.

- Reduce operating speed = screw in hexagon socket head screw.
- Increase operating speed = screw out hexagon socket head screw.

Always adjust the two throttles in a throttle pair equally when correcting the operating speed of a hydraulic function.

Folding via the tractor control unit

Fig. 176/…

(1) Hydraulic throttle valve - Height adjustment.

(2) Hydraulic throttle valve - Fold in the left boom extension.

(3) Hydraulic throttle valve - Fold in the right boom extension.

(4) Hydraulic throttle valve - Lock and unlock the swing compensation.

Fig. 177/…

(5) Hydraulic throttle valve - Fold out the boom extension.

(6) Hydraulic throttle valve - Fold in the boom extension.

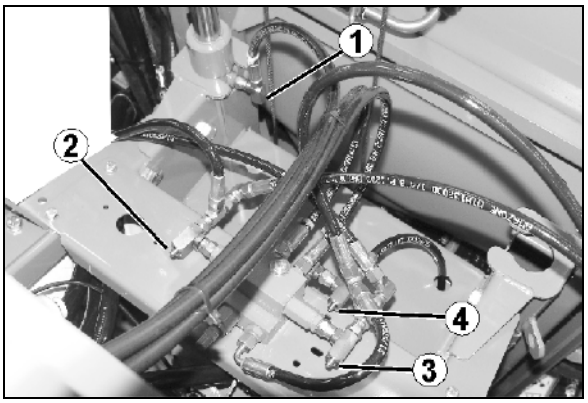


Fig. 176

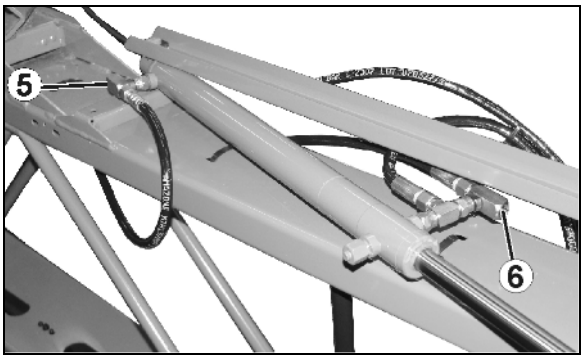


Fig. 177

Profi-folding I

Fig. 178/...

(1) Throttle - fold in the right-hand boom.

(2) Throttle - fold out the right-hand boom.

(3) Throttle - lock the swing compensation.

(4) Throttle transport safety catch.

(5) Hydraulic joints – tilt adjustment (the throttles are located on the hydraulic cylinder for tilt adjustment).

(6) Throttle - fold in the left-hand boom.

(7) Throttle - fold-out the left-hand boom.

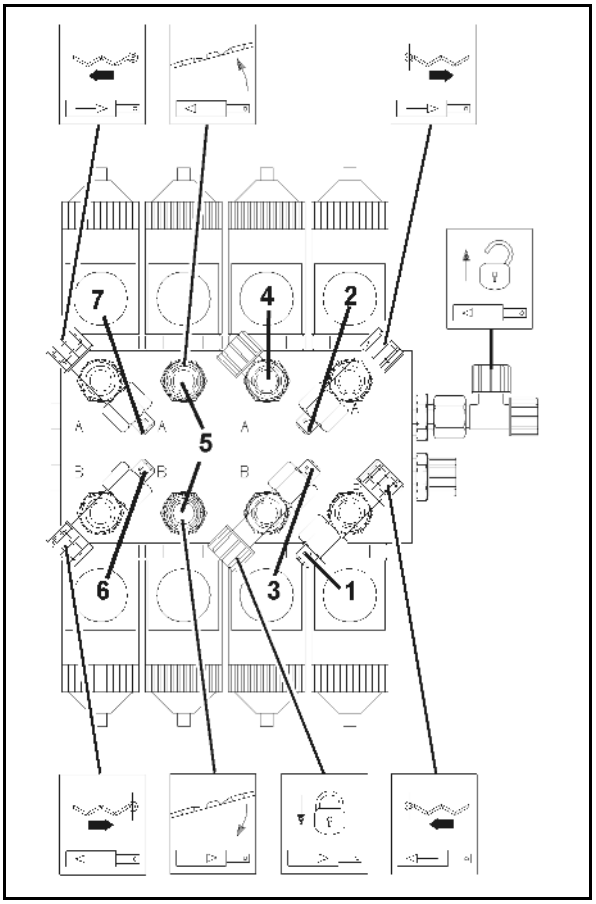


Fig. 178

Profi-folding II

Fig. 179/...

(1) Throttle - lower the right-hand boom.

(2) Throttle - raise the right-hand boom.

(3) Throttle - fold in the right-hand boom.

(4) Throttle - fold out the right-hand boom.

(5) Throttle - lock the swing compensation.

(6) Throttle transport safety catch.

(7) Hydraulic joints – tilt adjustment (the throttles are located on the hydraulic cylinder for tilt adjustment).

(8) Throttle - fold in the left-hand boom.

(9) Throttle - fold-out the left-hand boom.

(10) Throttle - lower the left-hand boom.

(11) Throttle - raise the left-hand boom.

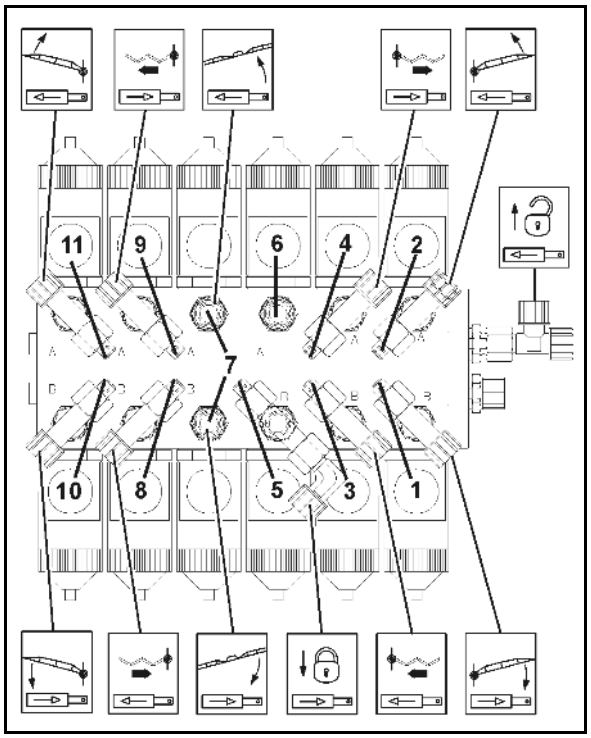


Fig. 179

12.12 Adjustments on the folded-out sprayer boom

Alignment parallel to the ground

With the sprayer boom folded out and correctly set, all the spraying nozzles must be of the same parallel distance to the ground.

If this is not the case, with the swing compensation **unlocked** align the folded-out sprayer boom by means of counterweights (Fig. 180/1). Secure the counterweights to the boom extension accordingly.

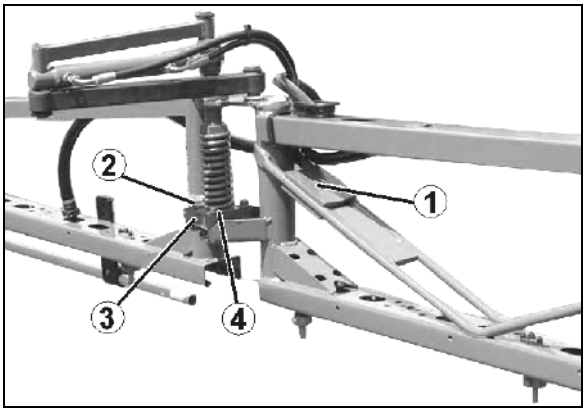


Fig. 180

Horizontal alignment

Viewed in the direction of travel, all boom sections of the sprayer boom must be flush in line. Horizontal alignment may be necessary

- after a long period of use
- or in the event of rough contact between the ground and the sprayer boom.

Inner boom section

1. Release the lock nut of the adjusting screw (Fig. 180/1).
2. Turn the adjusting screw against the stops until the inner boom is flush with the sprayer boom middle section.
3. Tighten the lock nut.

Outer boom section

1. Release the screws (Fig. 180/2) of the securing link (Fig. 180/3). The boom is aligned directly at the plastic catch (Fig. 180/4) through the slotted holes of the securing link.
2. Align the boom section.
3. Tighten the screws (Fig. 180/2).

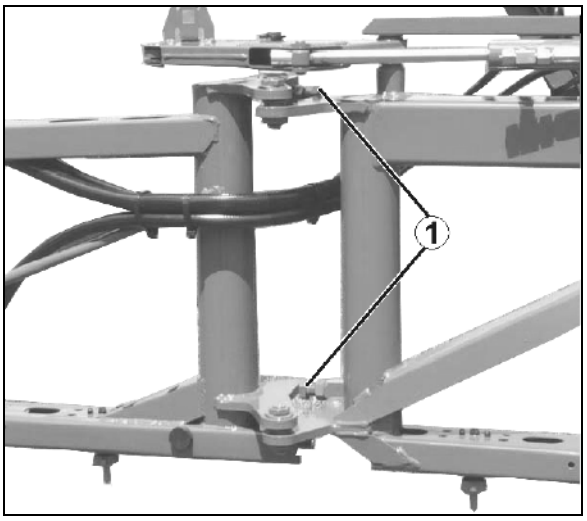


Fig. 181

12.13 Pump

12.13.1 Check the oil level

- Only use 20W30 branded oil or 15W40 multi purpose oil.
- Ensure the correct oil level. Damage may be caused both by the oil level being too low or too high.
- The read-off oil level can be averaged from the non-horizontal orientation of the pump in the hitch drawbar.
- Foam generation and cloudy oil are signs of a faulty pump membrane.

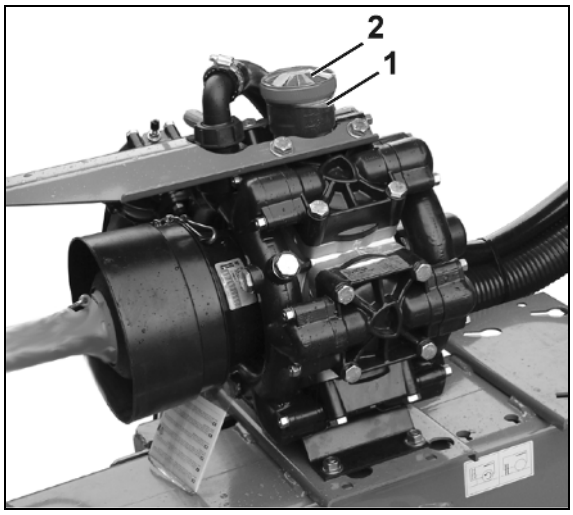


Fig. 182

1. Check whether the oil level is visible at the mark (Fig. 184/1) with the pump not running and standing on a flat surface.
2. If the oil level is not visible at the mark (Fig. 184/1), remove the lid (Fig. 184/2) and top up with oil.

12.13.2 Changing the oil

- After a few operating hours, check the oil level; top up if necessary.

1. Remove the pump.
2. Remove the lid (Fig. 184/2).
3. Drain the oil.
   - 3.1 Turn the pump on its head.
   - 3.2 Rotate the drive shaft by hand until the used oil has all run out.

     The option also exists to drain the oil from the drain plug. However, with this procedure a slight oil residue remains in the pump; we therefore recommend the first approach.
4. Place the pump on an even surface.
5. Turn the drive shaft left and right alternately and slowly fill with new oil. The right quantity of oil has been reached when the oil is visible at the mark (Fig. 184/1).

12.13.3 Cleaning

After each use, thoroughly clean the pump by pumping clear fresh water for several minutes.

12.13.4 Belt-driven pump

Checking/adjusting the belt tension

Test force Fe= 75 N

For a pump drive speed of 540 rpm:

→ maximum permissible deflection 14 mm

For a pump drive speed of 1,000 rpm:

→ maximum permissible deflection 16 mm

If the maximum deflection is exceeded, increase the belt tension by extending the wheelbase via the slotted holes.

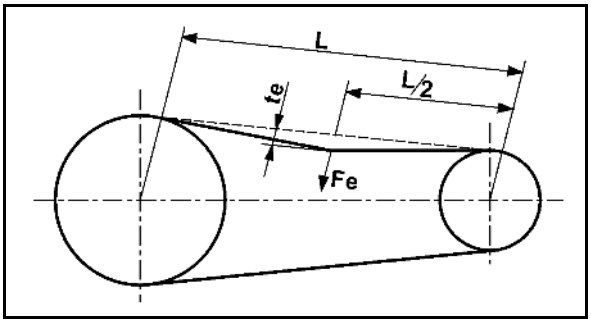


Fig. 183

Replacing the drive belt

Replace worn drive belts.

To do this:

1. Slacken the belt tension using the slotted holes on the lower V-belt pulley.
2. Remove the upper belt guard.
3. Unscrew a pump.
4. Replace the belt.

12.13.5 Checking and replacing the suction and pressure-side valves

- Pay attention to the respective installation positions of the valves on the suction and pressure sides before removing the valve groups (Fig. 184/5).
- When reassembling, ensure that the valve guide (Fig. 184/9) is not damaged. Damage may cause the valves to jam.
- Always tighten the nuts (Fig. 184/1,2) in a crosswise fashion using the specified torque. Improper tightening of the screws causes warping, which results in leaks.

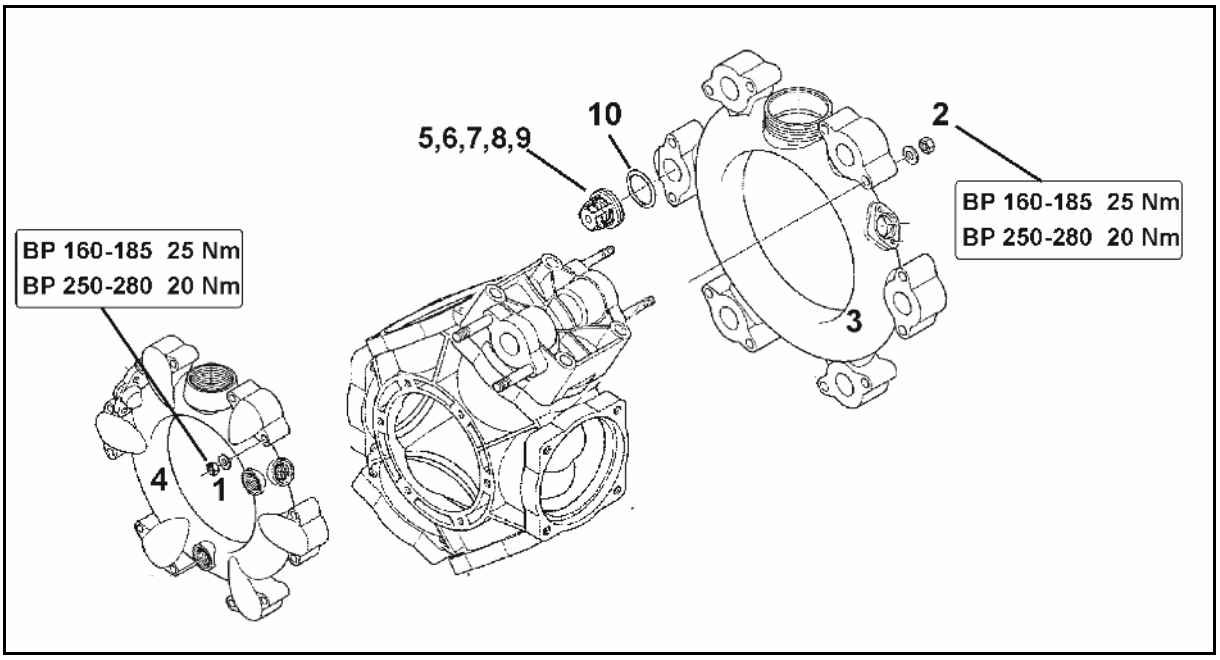


Fig. 184

1. If necessary, remove the pump.
2. Remove the nuts (Fig. 184/1,2).
3. Remove the suction and pressure port (Fig. 184/3 and Fig. 184/4).
4. Remove the valve groups (Fig. 184/5).
5. Check the valve seat (Fig. 184/6), valve (Fig. 184/7), valve spring (Fig. 184/8) and valve guide (Fig. 184/9) for wear or damage.
6. Remove the O-ring (Fig. 184/10).
7. Replace defective parts.
8. After testing and cleaning, fit the valve groups (Fig. 184/5).
9. Insert new O-rings (Fig. 184/10).
10. Mount the suction (Fig. 184/3) and pressure port (Fig. 184/4) on the pump housing.
11. Tighten the nuts (Fig. 184/1,2) in a crosswise fashion using a torque of **25 Nm (BP 160-185) / 20 Nm (AR 250-280)**

12.13.6 Checking and replacing the piston diaphragm

- At least once a year, check that the piston diaphragm (Fig. 185/8) is in perfect condition by removing it.
- Pay attention to the respective installation positions of the valves on the suction and pressure sides before removing the valve groups (Fig. 185/5).
- Check and replace the piston diaphragm for each piston individually. Only remove the next piston in sequence after the currently removed piston has been completely checked and refitted.
- Always swivel the piston to be checked upwards so that the oil in the pump housing does not run out.
- As a rule, replace all piston diaphragms (Fig. 185/8), even if only one piston diaphragm distorted, punctured or porous.

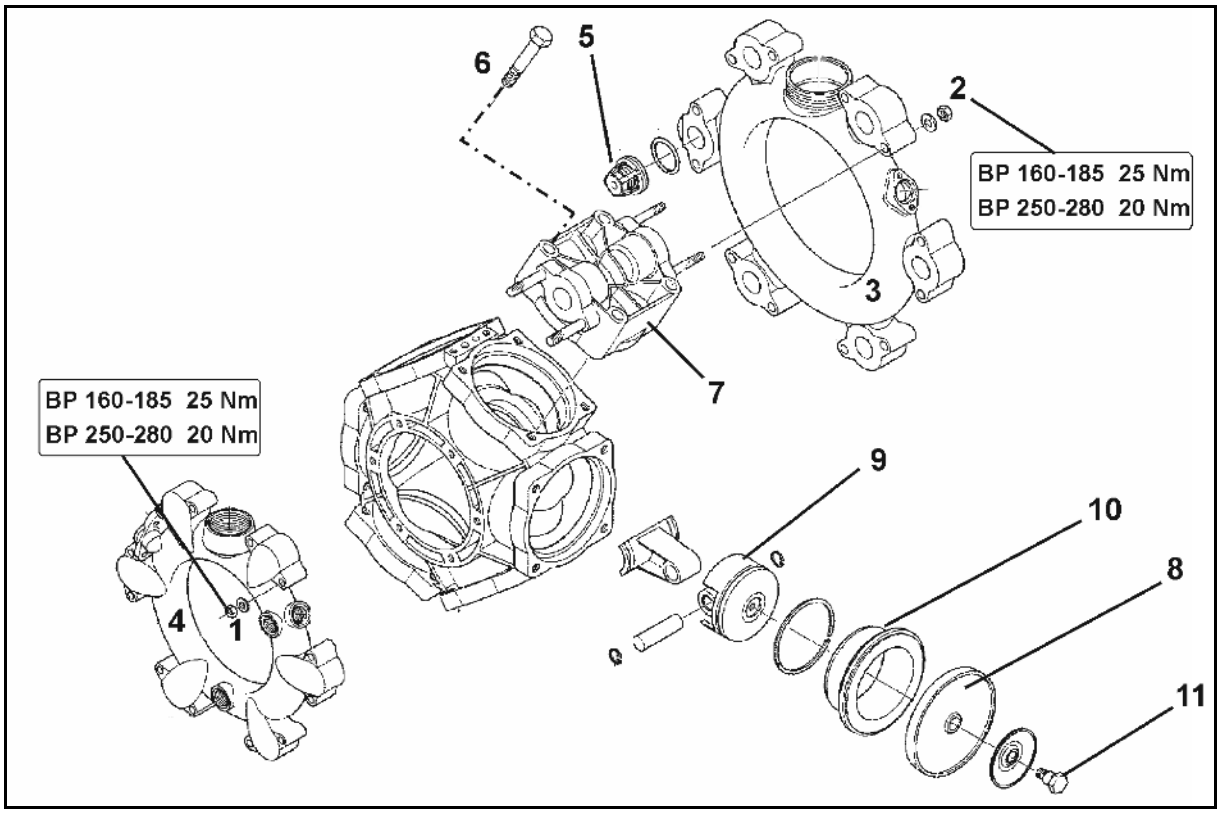


Fig. 185

Checking the piston diaphragm

1. If necessary, remove the pump.
2. Slacken the nuts (Fig. 185/1, 2).
3. Remove the suction and pressure port (Fig. 185/3 and Fig. 185/4).
4. Remove the valve groups (Fig. 185/5).
5. Remove the screws (Fig. 185/6).
6. Remove the cylinder head (Fig. 185/7).
7. Check the piston diaphragm (Fig. 185/8).
8. Replace the damaged piston diaphragm.

Replacing the piston diaphragm

- Ensure the correct position for the recesses and/or holes on the hydraulic cylinders.
- Secure the piston diaphragm (Fig. 185/8) with a washer disc and a screw (Fig. 185/11) on the piston (Fig. 185/9), so that the rim shows on the cylinder head side (Fig. 185/7).
- Always tighten the nuts (Fig. 185/1,2) in a crosswise fashion using the specified torque. Improper tightening of the nuts causes warping, which results in leaks.

1. Undo the screw (Fig. 185/11) and remove the piston diaphragm (Fig. 185/8) and the washer disc from the piston (Fig. 185/9).
2. If the piston diaphragm has been punctured, drain the oil/spray liquid mixture from the pump housing.
3. Remove the hydraulic cylinder (Fig. 185/10) from the pump housing.
4. Clean the pump housing by flushing it thoroughly with diesel oil or paraffin.
5. Clean all sealing faces.
6. Insert the cylinder (Fig. 185/10) back into the pump housing.
7. Fit the piston diaphragm (Fig. 185/8).
8. Mount the cylinder head (Fig. 185/7) on the pump housing and tighten the screws (Fig. 185/6) an equal amount in a crosswise fashion.

   Use adhesive for medium tight screw connections for the screw connection!
9. After testing and cleaning, fit the valve groups (Fig. 185/5).
10. Insert new O-rings.
11. Mount the suction (Fig. 185/3) and pressure port (Fig. 185/4) on the pump housing.
12. Tighten the nuts (Fig. 185/1,2) in a crosswise fashion using a torque of **25 Nm (BP 160-185) / 20 Nm (AR 250-280)**.

12.14 Calibrate the flow meter

For information on this, observe Operating manual for software ISO-BUS; section "Impulses per litre".

12.15 Field sprayer calibration

Test the field sprayer by carrying out calibration

- **before the start of the season.**
- **each time a nozzle is changed.**
- **to check the setting information in the spray tables.**
- **in the case of deviations between the actual and required spray rate [l/ha].**

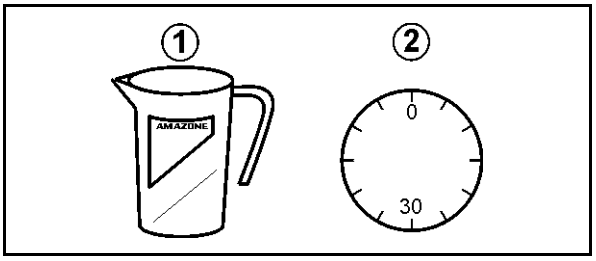
Any deviations between the actual and required spray rate [l/ha] may be caused by:

- the difference between the actual operational speed and that indicated on the tractor meter and/or
- natural wear to the spraying nozzles.

Calibration equipment:

(1) Quick-check beaker

(2) Stopwatch



Determining the actual spray rate while stationary via the individual nozzle output

Determine the nozzle output from at least 3 different nozzles. To do this, check one nozzle on the left boom, one on the right boom and one in the middle of the sprayer boom as described below.

1. Determine the precise spray rate [l/ha] required for the crop protection measure.
2. Determine the required spray pressure.
3. Control terminal / AMASPRAY^{+}:
   - 3.1 Enter the required spray rate into the control terminal.
   - 3.2 Enter the permissible spray pressure range for the spraying nozzles fitted to the sprayer boom on the control terminal.
   - 3.3 Switch the control terminal from AUTOMATIC mode over to the MANUAL mode.
4. Fill the spray liquid tank with water.
5. Switch on the agitator.
6. Manually set the required spray pressure.
7. Switch on spraying and check that all nozzles are functioning perfectly.
8. Calculate the individual nozzle output [l/min] at several nozzles.

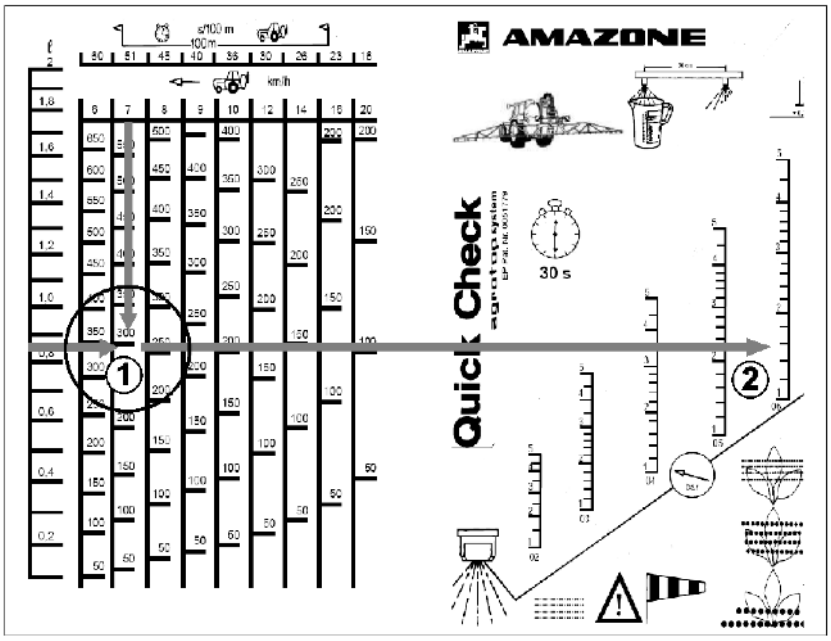
   To do so, hold the quick-check beaker under a nozzle for precisely 30 seconds.
9. Switch off spraying.
10. Calculate the average individual nozzle output [l/ha].

- Using the table on the quick-check beaker.
- By calculation.
- Using the spray table.

Example:

Nozzle size	'06'
Intended operational speed	7 km/h
Nozzle output on the left boom:	0.85 l/30s
Nozzle output in the centre	0.84 l/30s
Nozzle output on the right boom:	0.86 l/30s
Calculated average value:	**0.85 l/30s → 1.7 l/min**

1. Calculate the individual nozzle output [l/ha] using the quick-check beaker



(1) →calculated spread rate 290 l/ha
(2) →calculated spray pressure 1.6 bar

2. Calculate individual nozzle output [l/ha]

$$\frac{\text{d [l/min]} \times 1200}{\text{e [km/h]}} = \text{Spread rate[l/ha]}$$

- d: Nozzle output (calculated average value) [l/min]
- e: Operational speed [km/h]

$$\frac{1.7 \text{ [l/min]} \times 1200}{7 \text{ [km/h]}} = 291 \text{ [l/ha]}$$

3. Read the individual nozzle output [l/ha] from the spray table

From the spray table (see page 231):

→ Spread rate 291 l/ha
→ Spray pressure 1.6 bar

If the calculated values for spread rate/spray pressure do not agree with the set values:

- Calibrate the flow meter (see the operating manual for the operator control terminal)
- Check all nozzles for wear and blockages.

12.16 Nozzles

From time to time, check the seating of the slider (Fig. 186/7).

- To do this, insert the slider into the nozzle body (Fig. 186/2) as far as possible using moderate thumb pressure.

Do not insert the slider up to the stop when in a new condition under any circumstances.

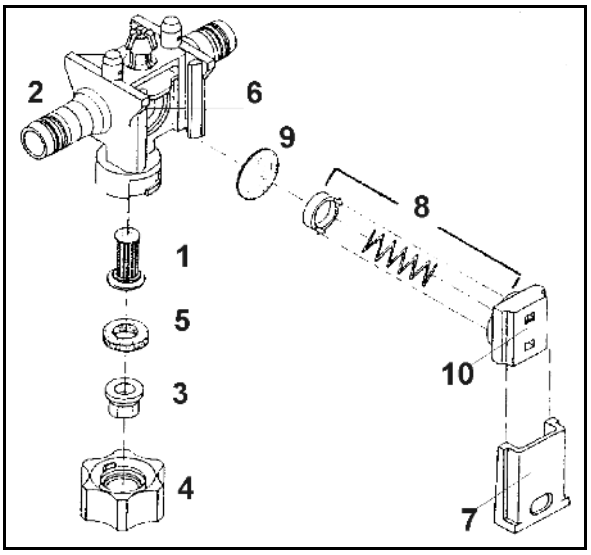


Fig. 186

12.16.1 Fitting the nozzle

1. Insert the nozzle filter (Fig. 186/1) into the nozzle body (Fig. 186/2) from below.
2. Insert the nozzle (Fig. 186/3) into the bayonet nut (Fig. 186/4)

Different coloured bayonet nuts are available for the different nozzles.

3. Insert the rubber seal (Fig. 186/5) above the nozzle.
4. Press a rubber seal into the seat for the bayonet nut.
5. Position a bayonet nut on the bayonet connection.
6. Screw on the bayonet nut up to the stop.

12.16.2 Removing the diaphragm valve if the nozzle is dripping

Deposits on the diaphragm seat (Fig. 186/6) can cause the nozzles to drip after the boom is shut-off. If this occurs, clean the diaphragm in question as follows:

1. Pull the slider (Fig. 186/7) out of the nozzle body (Fig. 186/2) towards the bayonet nut.
2. Remove the spring element (Fig. 186/8) and the diaphragm (Fig. 186/9).
3. Clean the diaphragm seat (Fig. 186/6).
4. Reassembly occurs in the reverse sequence.

Note the correct orientation for installing the spring element. For installation, the stepped, upwards-sloping edges on the left and right of the housing of the spring element (Fig. 186/10) must slope up in the direction of the boom profile.

12.17 Line filter

- Clean the line filters
  (Fig. 187/1) 3 - 4 months depending on operating conditions).
- Change damaged filter inserts.

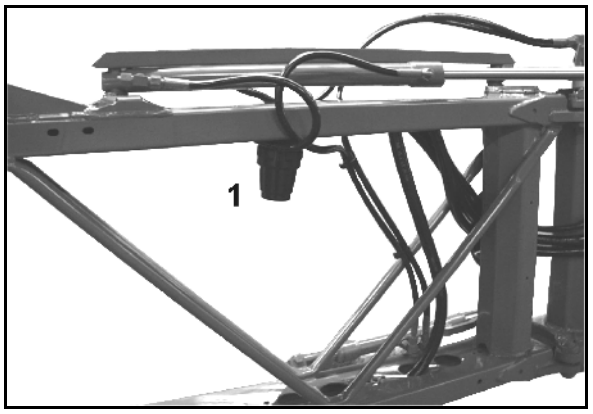


Fig. 187

12.18 Instructions on testing the field sprayer

- Only authorised centres are permitted to carry out spray tests.
- According to law, a spray test must be carried out:
  - o 6 months after commissioning (if not performed at time of purchase) at the latest, then
  - o every two years thereafter.

Field sprayer test kit (special equipment), order no.: 935680

Fig. 188/...

(1) Push-on cap (Order no.: 913 954) and connector (Order no.: ZF195)

(2) Flow meter connection (Order no.: 919967)

(3) Pressure gauge connection (Order no.: 7107000)

(4) O-Ring (Order no.: FC122)

(5) Hose connection (Order no.: GE095) (6) Sleeve nut (Order no.: GE021)

(7) Hose clip (Order no.: KE006)

(8) Plug-in socket (Order no.: 919345)

(9) O-Ring (Order no.: FC112)

(10) Turned socket (Order no.: 935679)

(11) Securing plug (Order no.: ZF195)

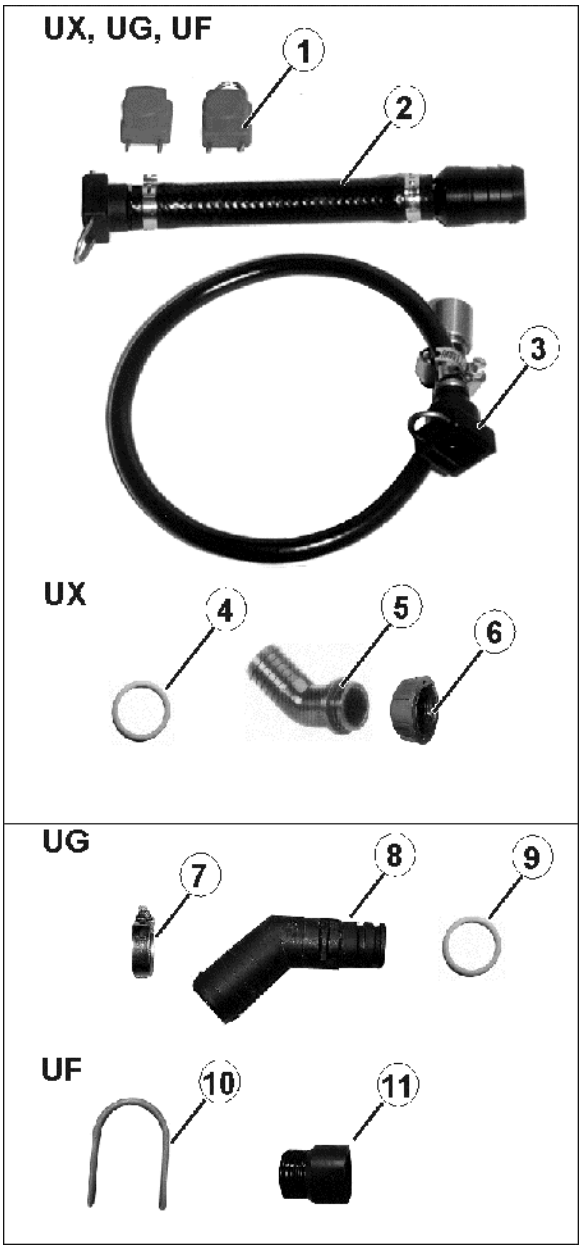


Fig. 188

Pump test - testing pump performance (delivery capacity, pressure)

1. Undo the sleeve nut (Fig. 189/1).
2. Attach the hose connection.
3. Tighten the sleeve nut.

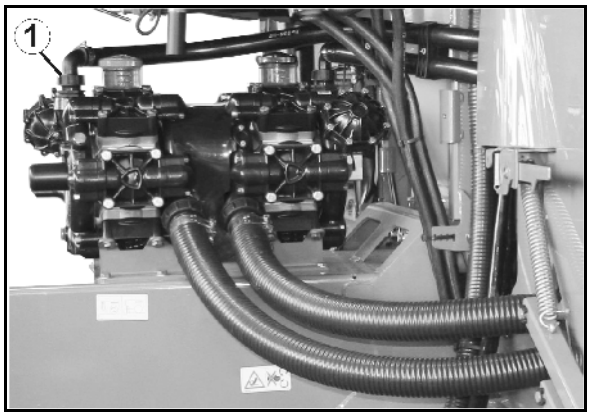


Fig. 189

Flow meter test

1. Remove all spray lines from the part width section valves (Fig. 190/1).
2. Connect the flow meter connection (Fig. 188/2) to a part width section valve and connect to the tester.
3. Block the connections for the remaining part width section valves using blanks (Fig. 188/1).
4. Switch on spraying.

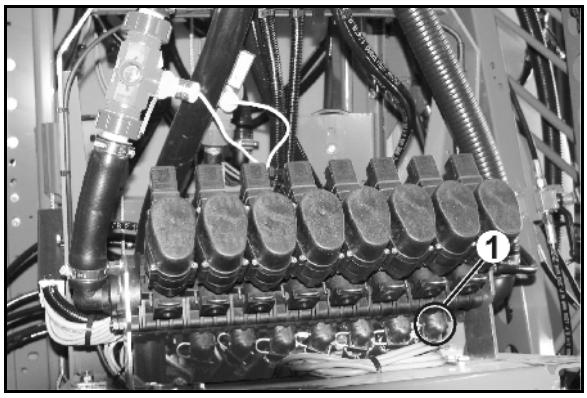


Fig. 190

Pressure gauge test

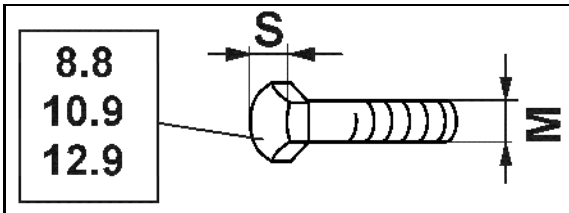
1. Remove a spray line from a part width section valve.
2. Connect the pressure gauge connection (Fig. 188/3) to a part width section valve with the help of the turned socket.
3. Screw the check gauge 1/4 of an inch into the inside thread.
4. Switch on spraying.

12.19 Electric lighting system

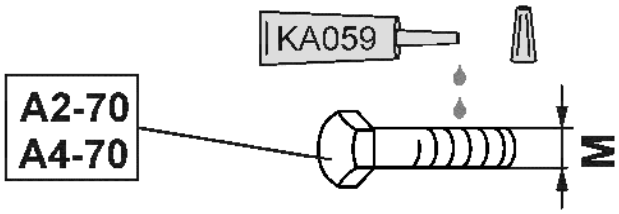
Replacement of light bulbs:

1. Unscrew the safety glass.
2. Remove the defective bulb.
3. Insert the replacement bulb (note the correct voltage and wattage).
4. Insert and screw on the sight glass.

12.20 Screw tightening torques



M	S	Nm 8.8	10.9	12.9
M 8	13	25	35	41
M 8x1		27	38	41
M 10	16 (17)	49	69	83
M 10x1		52	73	88
M 12	18 (19)	86	120	145
M 12x1,5		90	125	150
M 14	22	135	190	230
M 14x1,5		150	210	250
M 16	24	210	300	355
M 16x1,5		225	315	380
M 18	27	290	405	485
M 18x1,5		325	460	550
M 20	30	410	580	690
M 20x1,5		460	640	770
M 22	32	550	780	930
M 22x1,5		610	860	1050
M 24	36	710	1000	1200
M 24x2		780	1100	1300
M 27	41	1050	1500	1800
M 27x2		1150	1600	1950
M 30	46	1450	2000	2400
M 30x2		1600	2250	2700



M	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24
Nm	2,3	4,6	7,9	19,3	39	66	106	162	232	326	247	314

12.21 Disposing of the field sprayer

Carefully clean the whole field sprayer (inside and out) before disposing of the field sprayer.

The following components are eligible for energy recovery*: spray liquid tank, induction bowl, flushing water tank, fresh water tank, hoses and plastic fittings.

Metal parts can be scrapped.

Follow the statutory requirements for each individual material.

* Energy recovery

is the process of reclaiming the energy contained in plastics by burning them and using the energy released to generate electricity and/or steam or to supply process heat. Energy recovery is suitable for mixed and contaminated plastics, in particular for any plastics which have come into contact with pollutants.

13 Spray table

13.1 Spray tables for flat-fan, anti-drift, injector and airmix nozzles, spraying height 50 cm

- The spray rates [l/ha] listed in the spray tables are only valid for water. To convert the spray rates given into AUS, multiply these by 0.88 and, for NP solutions, by 0.85.
- Fig. 191 helps with the selection of the right nozzle type. The nozzle type is determined by
  - the intended operational speed,
  - the required spray rate and
  - the required atomisation characteristic (fine, medium or coarse-dropped) of the crop protection agent used for the crop protection measure.
- Fig. 192 is used to
  - determine the nozzle size.
  - determine the required spray pressure.
  - determine the required individual nozzle output for calibrating the field sprayer.

Permissible pressure ranges for different nozzle types and sizes

Nozzle type	Manufacturer	Permissible pressure range [bar]	
		min. pressure	max. pressure
XRC	TeeJet	1	5
AD	Lechler	1,5	5
Air Mix	agrotop	1	6
IDK / IDKN	Lechler	1	6
ID3 0,1-0,15		3	8
ID3 0,2-0,8		2	8
AI	TeeJet	2	8
TTI		1	7
AVI Twin	agrotop	2	8
TD Hi Speed	agrotop	2	10

For further information about the nozzle characteristics, see the nozzle manufacturer's website.

www.agrotop.com / www.lechler-agri.de / www.teejet.com

Selecting the nozzle type

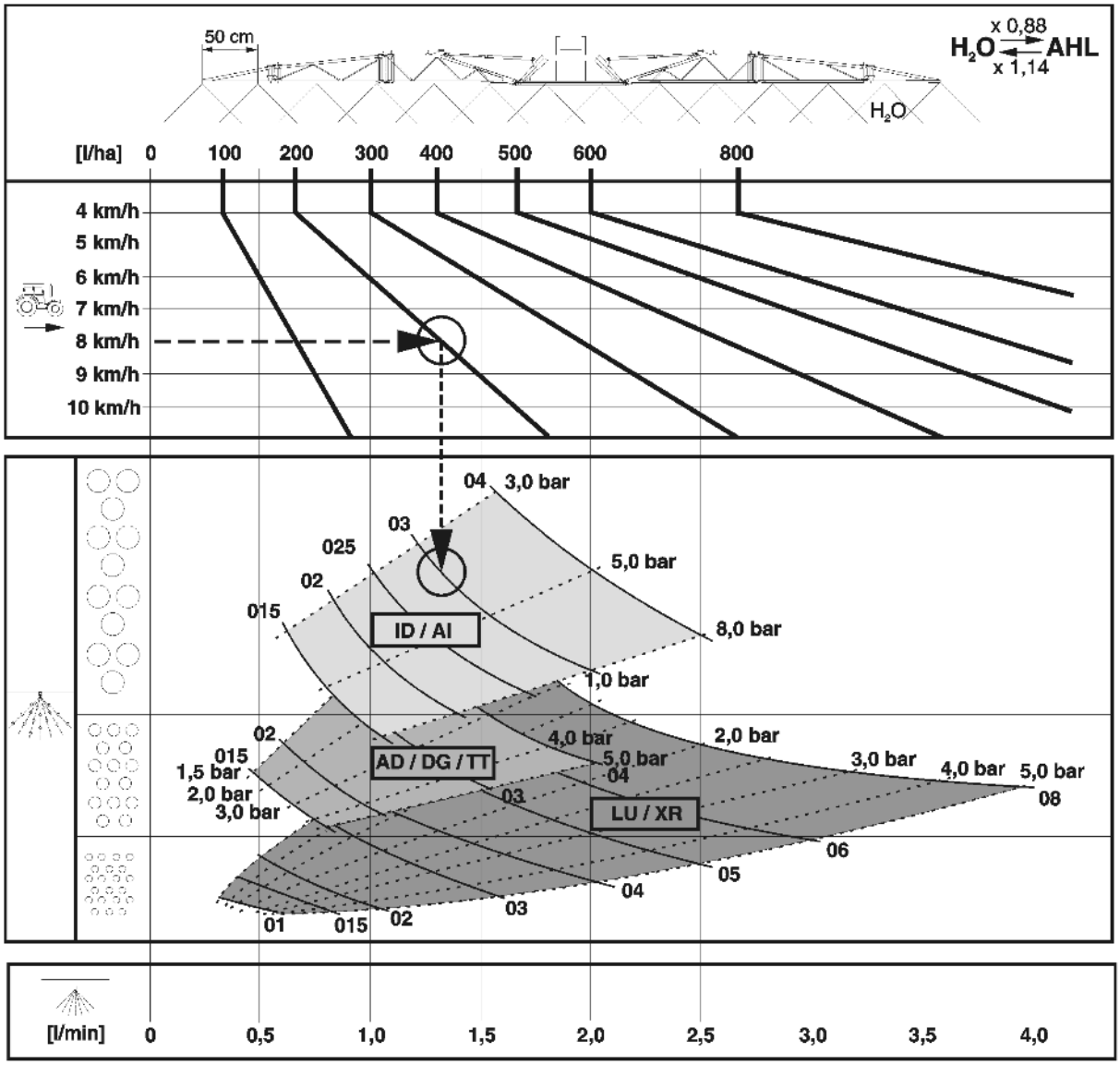


Fig. 191

Example:

Required spray rate:	**200 l/ha**
Intended operational speed:	**8 km/h**
Required atomisation characteristic for the crop protection measure:	**coarse-dropped** (fine drifting)
Required nozzle type:	?
Required nozzle size:	?
Required spray pressure:	? bar
Required individual nozzle output for calibrating the field sprayer:	? l/min

Determining the nozzle type, nozzle size, spray pressure and individual nozzle output

1. Determine the working point for the required spray rate (**200 l/ha**) and the intended operational speed (**8 km/h**).
2. At the working point, trace a line down the table. Depending on the position of the working point, this line will run through the cells for various nozzle types.
3. Select the best nozzle type for the crop protection measure in question, with reference to the required atomisation characteristic (fine, medium or coarse-dropped).

→ Nozzle choice for the example given above:

→ Nozzle type: **AI or ID**

4. Go to the spray table (Fig. 192).
5. In the column with the intended operational speed (**8 km/h**), find the required spray rate (**200 l/ha**) or a figure which is as close as possible to the required spray rate (in this case, for example, **195 l/ha**).
6. In the line with the required spray rate (**195 l/ha**),
   - o read the nozzle sizes in question. Select a suitable nozzle size (e.g.**'03'**).
   - o where the nozzle size column intersects with the selected nozzle size, read the required spray pressure (e.g. **3.7 bar**).
   - o read the required individual nozzle output (**1.3 l/min**) for calibrating the field sprayer.

Required nozzle type:	**AI / ID**
Required nozzle size:	**'03'**
Required spray pressure:	**3.7 bar**
Required individual nozzle output for calibrating the field sprayer:	**1.3 l/min**

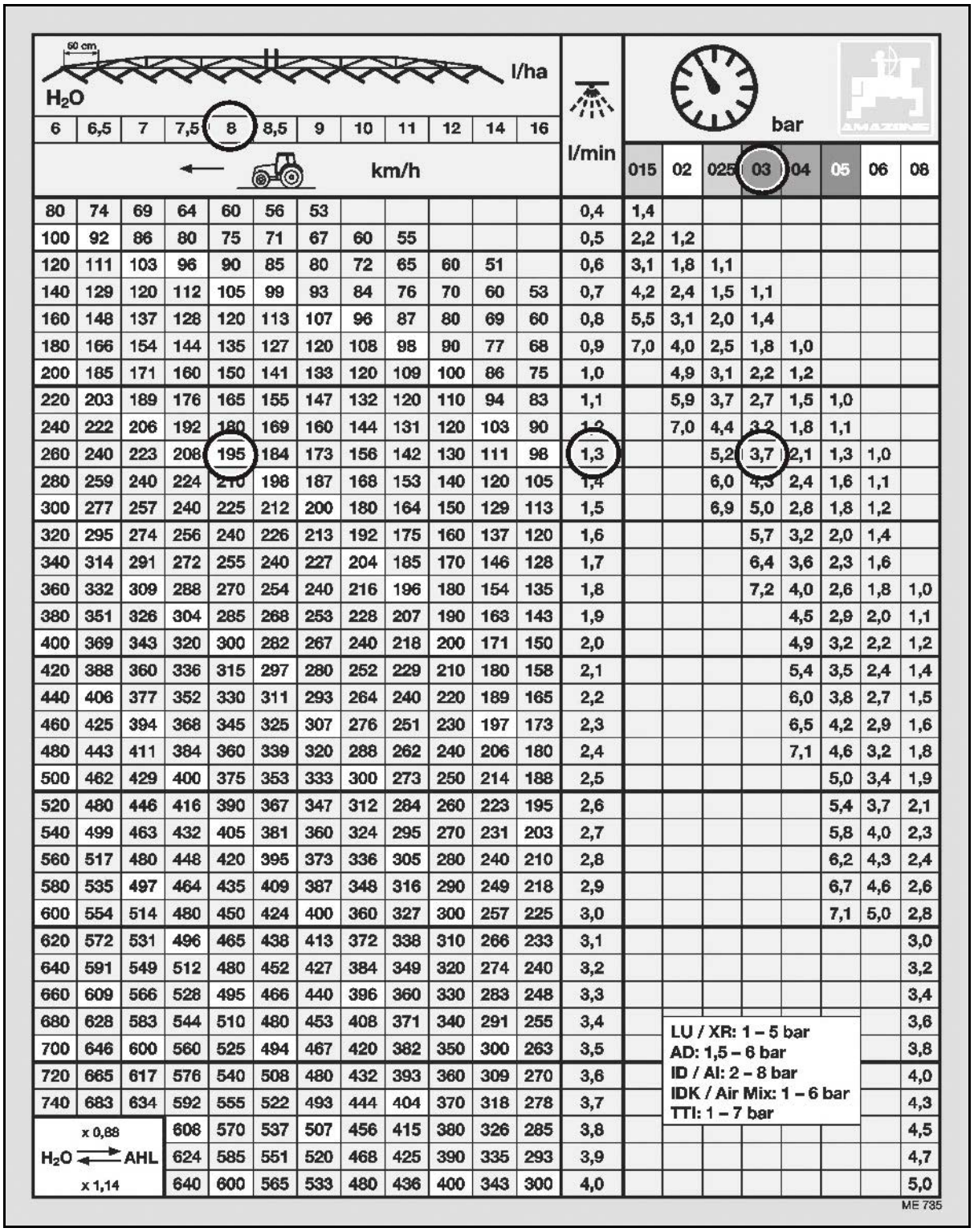

60 cm
l/ha
H2O
6 6,5 7 7,5 8 8,5 9 10 11 12 14 16
km/h
l/min
bar
015 02 025 03 04 05 06 08
80 74 69 64 60 56 53 0,4 1,4
100 92 86 80 75 71 67 60 55 0,5 2,2 1,2
120 111 103 96 90 85 80 72 65 60 51 0,6 3,1 1,8 1,1
140 129 120 112 105 99 93 84 76 70 60 53 0,7 4,2 2,4 1,5 1,1
160 148 137 128 120 113 107 96 87 80 69 60 0,8 5,5 3,1 2,0 1,4
180 166 154 144 135 127 120 108 98 90 77 68 0,9 7,0 4,0 2,5 1,8 1,0
200 185 171 160 150 141 133 120 109 100 86 75 1,0 4,9 3,1 2,2 1,2
220 203 189 176 165 155 147 132 120 110 94 83 1,1 5,9 3,7 2,7 1,5 1,0
240 222 206 192 180 169 160 144 131 120 103 90 7,0 4,4 3,2 1,8 1,1
260 240 223 208 195 184 173 156 142 130 111 98 1,3 5,2 3,7 2,1 1,3 1,0
280 259 240 224 210 198 187 168 153 140 120 105 6,0 4,3 2,4 1,6 1,1
300 277 257 240 225 212 200 180 164 150 129 113 1,5 6,9 5,0 2,8 1,8 1,2
320 295 274 256 240 226 213 192 175 160 137 120 1,6 5,7 3,2 2,0 1,4
340 314 291 272 255 240 227 204 185 170 146 128 1,7 6,4 3,6 2,3 1,6
360 332 309 288 270 254 240 216 196 180 154 135 1,8 7,2 4,0 2,6 1,8 1,0
380 351 326 304 285 268 253 228 207 190 163 143 1,9 4,5 2,9 2,0 1,1
400 369 343 320 300 282 267 240 218 200 171 150 2,0 4,9 3,2 2,2 1,2
420 388 360 336 315 297 280 252 229 210 180 158 2,1 5,4 3,5 2,4 1,4
440 406 377 352 330 311 293 264 240 220 189 165 2,2 6,0 3,8 2,7 1,5
460 425 394 368 345 325 307 276 251 230 197 173 2,3 6,5 4,2 2,9 1,6
480 443 411 384 360 339 320 288 262 240 206 180 2,4 7,1 4,6 3,2 1,8
500 462 429 400 375 353 333 300 273 250 214 188 2,5 5,0 3,4 1,9
520 480 446 416 390 367 347 312 284 260 223 195 2,6 5,4 3,7 2,1
540 499 463 432 405 381 360 324 295 270 231 203 2,7 5,8 4,0 2,3
560 517 480 448 420 395 373 336 305 280 240 210 2,8 6,2 4,3 2,4
580 535 497 464 435 409 387 348 316 290 249 218 2,9 6,7 4,6 2,6
600 554 514 480 450 424 400 360 327 300 257 225 3,0 7,1 5,0 2,8
620 572 531 496 465 438 413 372 338 310 266 233 3,1 3,0
640 591 549 512 480 452 427 384 349 320 274 240 3,2 3,2
660 609 566 528 495 466 440 396 360 330 283 248 3,3 3,4
680 628 583 544 510 480 453 408 371 340 291 255 3,4 3,6
700 646 600 560 525 494 467 420 382 350 300 263 3,5 3,8
720 665 617 576 540 508 480 432 393 360 309 270 3,6 4,0
740 683 634 592 555 522 493 444 404 370 318 278 3,7 4,3
x 0,88
H2O AHL
x 1,14
608 570 537 507 456 415 380 326 285 3,8 4,5
624 585 551 520 468 425 390 335 293 3,9 4,7
640 600 565 533 480 436 400 343 300 4,0 5,0
LU / XR: 1 – 5 bar
AD: 1,5 – 6 bar
ID / AI: 2 – 8 bar
IDK / Air Mix: 1 – 6 bar
TTI: 1 – 7 bar
ME 735

Fig. 192

13.2 Spraying nozzles for liquid manure

Nozzle type	Manufacturer	Permissible pressure range [bar]	
		min. pressure	max. pressure
3- jet	agrotop	2	8
7- hole	TeeJet	1,5	4
FD	Lechler	1,5	4
Drag hose	**AMAZONE**	1	4

13.2.1 Spray table for three-ray nozzle, spraying height 120 cm

AMAZONE - spray table for three-ray nozzles (yellow)

Pressure	Nozzle output		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	0.36	0.32	64	55	48	43	39	35	32	28	24
1.2	0.39	0.35	69	60	52	47	42	38	35	30	26
1.5	0.44	0.39	78	67	59	53	47	43	39	34	30
1.8	0.48	0.42	85	73	64	57	51	47	43	37	32
2.0	0.50	0.44	88	75	66	59	53	48	44	38	33
2.2	0.52	0.46	92	78	69	62	55	50	46	39	35
2.5	0.55	0.49	98	84	74	66	57	54	49	52	37
2.8	0.58	0.52	103	88	77	69	62	56	52	44	39
3.0	0.60	0.53	106	91	80	71	64	58	53	46	40

AMAZONE - spray table for three-ray nozzles (red)

Pressure	Nozzle output		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	0.61	0.54	108	93	81	72	65	59	54	47	41
1.2	0.67	0.59	118	101	88	78	70	64	59	51	44
1.5	0.75	0.66	132	114	99	88	79	72	66	57	50
1.8	0.79	0.69	138	119	104	92	83	76	69	60	52
2.0	0.81	0.71	142	122	107	95	85	78	71	61	54
2.2	0.84	0.74	147	126	111	98	88	80	74	63	56
2.5	0.89	0.78	155	133	117	104	93	84	78	67	59
2.8	0.93	0.82	163	140	122	109	98	87	82	70	61
3.0	0.96	0.84	168	144	126	112	101	92	84	72	63

AMAZONE - spray table for three-ray nozzles (blue)

Pres-sure	Nozzle output		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	0.86	0.76	152	130	114	101	91	83	76	65	57
1.2	0.94	0.83	166	142	124	110	99	91	83	71	62
1.5	1.05	0.93	186	159	140	124	112	102	93	80	70
1.8	1.11	0.98	196	167	147	131	117	107	98	84	74
2.0	1.15	1.01	202	173	152	135	121	110	101	87	76
2.2	1.20	1.06	212	182	159	141	127	116	106	91	80
2.5	1.26	1.12	224	192	168	149	135	122	112	96	84
2.8	1.32	1.17	234	201	176	156	141	128	117	101	88
3.0	1.36	1.20	240	206	180	160	144	131	120	103	90

AMAZONE - spray table for three-ray nozzles (white)

Pres-sure	Nozzle output		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	1.16	1.03	206	177	155	137	124	213	103	89	78
1.2	1.27	1.12	224	192	168	149	134	222	112	96	84
1.5	1.42	1.26	252	217	190	168	151	138	126	109	95
1.8	1.56	1.38	277	237	207	184	166	151	139	119	104
2.0	1.64	1.45	290	249	217	193	174	158	145	125	109
2.2	1.73	1.54	307	263	230	204	185	168	154	132	115
2.5	1.84	1.62	325	279	244	216	195	178	163	140	122
2.8	1.93	1.71	342	293	256	228	205	187	171	147	128
3.0	2.01	1.78	356	305	267	237	214	194	178	153	134

13.2.2 Spray table for 7-hole nozzles

AMAZONE spray table for 7-hole nozzle SJ7-02VP (yellow)

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	0.55	0.49	98	84	74	65	59	53	49	42	37
2.0	0.64	0.57	114	98	86	76	68	62	57	49	43
2.5	0.72	0.64	128	110	96	85	77	70	64	55	48
3.0	0.80	0.71	142	122	107	95	85	77	71	61	53
3.5	0.85	0.75	150	129	113	100	90	82	75	64	56
4.0	0.93	0.82	164	141	123	109	98	89	82	70	62

AMAZONE spray table for 7-hole nozzle SJ7-03VP (blue)

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	0.87	0.77	154	132	116	103	92	84	77	66	58
2.0	1.00	0.88	176	151	132	117	106	96	88	75	66
2.5	1.10	0.97	194	166	146	129	116	106	97	83	73
3.0	1.18	1.04	208	178	156	139	125	113	104	89	78
3.5	1.27	1.12	224	192	168	149	134	122	112	96	84
4.0	1.31	1.16	232	199	174	155	139	127	116	99	87

AMAZONE spray table for 7-hole nozzle SJ7-04VP (red)

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	1.17	1.04	208	178	156	139	125	113	104	89	78
2.0	1.33	1.18	236	202	177	157	142	129	118	101	89
2.5	1.45	1.28	256	219	192	171	154	140	128	110	96
3.0	1.55	1.37	274	235	206	183	164	149	137	117	103
3.5	1.66	1.47	295	253	221	196	177	161	147	126	110
4.0	1.72	1.52	304	261	228	203	182	166	152	130	114

AMAZONE spray table for 7-hole nozzle SJ7-05VP (brown)

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	1.49	1.32	264	226	198	176	158	144	132	113	99
2.0	1.68	1.49	298	255	224	199	179	163	149	128	112
2.5	1.83	1.62	324	278	243	216	194	177	162	139	122
3.0	1.95	1.73	346	297	260	231	208	189	173	148	130
3.5	2.11	1.87	374	321	281	249	224	204	187	160	140
4.0	2.16	1.91	382	327	287	255	229	208	191	164	143

AMAZONE spray table for 7-hole nozzle SJ7-06VP (grey)

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	1.77	1.57	314	269	236	209	188	171	157	135	118
2.0	2.01	1.78	356	305	267	237	214	194	178	153	134
2.5	2.19	1.94	388	333	291	259	233	212	194	166	146
3.0	2.35	2.08	416	357	312	277	250	227	208	178	156
4.0	2.61	2.31	562	396	347	308	277	252	231	198	173

AMAZONE spray table for 7-hole nozzle SJ7-08VP (white)

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	2.28	2.02	404	346	303	269	242	220	202	173	152
2.0	2.66	2.35	470	403	353	313	282	256	235	201	176
2.5	2.94	2.60	520	446	390	347	312	284	260	223	195
3.0	3.15	2.79	558	478	419	372	335	304	279	239	209
4.0	3.46	3.06	612	525	459	408	367	334	306	262	230

13.2.3 Spray table for FD nozzles

AMAZONE spray table for FD-04 nozzle

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1,5	1,13	1,00	200	171	150	133	120	109	100	86	75
2,0	1,31	1,15	230	197	173	153	138	125	115	99	86
2,5	1,46	1,29	258	221	194	172	155	141	129	111	97
3,0	1,60	1,41	282	241	211	188	169	154	141	121	106
4,0	1,85	1,63	326	279	245	217	196	178	163	140	122

AMAZONE spray table for FD-05 nozzle

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1,5	1,41	1,24	248	213	186	165	149	135	124	106	93
2,0	1,63	1,44	288	247	216	192	173	157	144	123	108
2,5	1,83	1,61	322	276	242	215	193	176	161	138	121
3,0	2,00	1,76	352	302	264	235	211	192	176	151	132
4,0	2,31	2,03	406	348	305	271	244	221	203	174	152

AMAZONE spray table for FD-06 nozzle

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	1.70	1.49	298	255	224	199	179	163	149	128	112
2.0	1.96	1.72	344	295	258	229	206	188	172	147	129
2.5	2.19	1.93	386	331	290	257	232	211	193	165	145
3.0	2.40	2.11	422	362	317	282	253	230	211	181	158
4.0	2.77	2.44	488	418	366	325	293	266	244	209	183

AMAZONE spray table for FD-08 nozzle

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	2.26	1.99	398	341	299	265	239	217	199	171	149
2.0	2.61	2.30	460	394	345	307	276	251	230	197	173
2.5	2.92	2.57	514	441	386	343	308	280	257	220	193
3.0	3.20	2.82	563	483	422	375	338	307	282	241	211
4.0	3.70	3.25	650	557	488	433	390	355	325	279	244

AMAZONE spray table for FD-10 nozzle

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	2.83	2.49	498	427	374	332	299	272	249	214	187
2.0	3.27	2.88	576	494	432	384	345	314	288	246	216
2.5	3.65	3.21	642	551	482	429	385	350	321	275	241
3.0	4.00	3.52	704	604	528	469	422	384	352	302	264
4.0	4.62	4.07	813	697	610	542	488	444	407	348	305

13.3 Spray table for drag hose unit

Pres-sure	Nozzle output per dosing disc		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1,0	0,20	0,18	71	61	53	47	43	37	36	31	27
1,2	0,22	0,19	78	67	58	52	47	43	39	34	29
1,5	0,24	0,21	85	73	64	57	51	47	43	37	32
1,8	0,26	0,23	92	79	69	61	55	50	46	40	35
2,0	0,28	0,25	99	85	74	66	60	54	50	43	37
2,2	0,29	0,26	103	88	77	68	62	56	52	44	39
2,5	0,31	0,27	110	94	82	73	66	60	55	47	41
2,8	0,32	0,28	113	97	85	76	68	62	57	49	43
3,0	0,34	0,30	120	103	90	80	72	66	60	52	45
3,5	0,36	0,32	127	109	96	85	77	70	64	55	48
4,0	0,39	0,35	138	118	104	92	83	76	69	59	52

AMAZONE Spray table with dosing disc 4916-32, (dia. 0.8 mm)

Pres-sure	Nozzle output per dosing disc		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1,0	0,31	0,27	110	94	82	73	66	60	55	47	41
1,2	0,34	0,30	120	103	90	80	72	66	60	52	45
1,5	0,38	0,34	135	115	101	90	81	74	68	58	51
1,8	0,41	0,36	145	124	109	97	87	79	73	62	55
2,0	0,43	0,38	152	130	114	101	92	83	76	65	57
2,2	0,45	0,40	159	137	119	106	96	87	80	69	60
2,5	0,48	0,42	170	146	127	113	102	93	85	73	64
2,8	0,51	0,45	181	155	135	120	109	98	91	78	68
3,0	0,53	0,47	188	161	141	125	113	103	94	81	71
3,5	0,57	0,50	202	173	151	135	121	110	101	87	76
4,0	0,61	0,54	216	185	162	144	130	118	108	93	81

AMAZONE Spray table for dosing disc 4916-39, (dia. 1.0 mm) (standard)

Pres-sure	Nozzle output per dosing disc		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1,0	0,43	0,38	153	131	114	101	92	84	77	66	57
1,2	0,47	0,41	167	143	124	110	100	91	84	72	62
1,5	0,53	0,47	187	160	141	126	112	102	94	80	71
1,8	0,58	0,51	204	175	154	137	122	112	102	88	77
2,0	0,61	0,53	216	185	162	144	130	118	108	93	81
2,2	0,64	0,56	227	194	170	151	136	124	114	97	85
2,5	0,68	0,59	240	206	180	160	142	132	120	103	90
2,8	0,71	0,62	251	215	189	168	151	137	126	108	95
3,0	0,74	0,64	262	224	197	175	158	143	131	112	99
3,5	0,79	0,69	280	236	210	186	168	153	140	118	105
4,0	0,85	0,74	302	259	226	201	181	165	151	130	113

AMAZONE Spray table for dosing disc 4916-45, (dia. 1.2 mm)

Pres-sure	Nozzle output per dosing disc		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1,0	0,57	0,50	202	173	151	135	121	110	101	87	76
1,2	0,62	0,55	219	188	165	146	132	120	110	94	83
1,5	0,70	0,62	248	212	186	165	149	135	124	106	93
1,8	0,77	0,68	273	234	204	182	164	148	137	117	102
2,0	0,81	0,72	287	246	215	192	172	157	144	123	108
2,2	0,86	0,76	304	261	228	203	183	166	152	131	114
2,5	0,92	0,81	326	279	244	217	196	178	163	140	122
2,8	0,96	0,85	340	291	255	227	204	186	170	146	128
3,0	1,00	0,89	354	303	266	236	213	193	177	152	133
3,5	1,10	0,97	389	334	292	260	234	213	195	167	146
4,0	1,16	1,03	411	352	308	274	246	224	206	176	154

AMAZONE Spray table for dosing disc 4916-55, (dia. 1.4 mm)

Pres-sure	Nozzle output per dosing disc		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1,0	0,86	0,76	304	261	228	203	183	166	152	131	114
1,2	0,93	0,82	329	282	247	219	198	180	165	141	124
1,5	1,05	0,93	372	319	278	248	223	203	186	160	139
1,8	1,15	1,02	407	349	305	271	245	222	204	175	153
2,0	1,22	1,08	432	370	324	288	259	236	216	185	162
2,2	1,27	1,12	450	385	337	300	270	245	225	163	168
2,5	1,35	1,19	478	410	358	319	287	261	239	205	179
2,8	1,43	1,27	506	434	380	337	304	276	253	217	190
3,0	1,47	1,30	520	446	390	347	312	284	260	223	195
3,5	1,59	1,41	563	482	422	375	338	307	282	241	211
4,0	1,69	1,50	598	513	449	399	359	327	299	257	225

13.4 Conversion table for spraying ammonium nitrate / urea solution (AUS) liquid fertiliser

(Density 1.28 kg/l, i.e. approx. 28 kg N for 100 kg of liquid fertiliser or 36 kg N for 100 litres of liquid fertiliser at 5

N kg	Sol. N l	Sol. N kg	N kg	Sol. N l	Sol. N kg	N kg	Sol. N l	Sol. N kg	N kg	Sol. N l	Sol. N kg
10	27.8	35.8	52	144.6	186.0	94	261.2	335.8	136	378.0	485.0
12	33.3	42.9	54	150.0	193.0	96	266.7	342.7	138	384.0	493.0
14	38.9	50.0	56	155.7	200.0	98	272.0	350.0	140	389.0	500.0
16	44.5	57.1	58	161.1	207.3	100	278.0	357.4	142	394.0	507.0
18	50.0	64.3	60	166.7	214.2	102	283.7	364.2	144	400.0	515.0
20	55.5	71.5	62	172.3	221.7	104	285.5	371.8	146	406.0	521.0
22	61.6	78.5	64	177.9	228.3	106	294.2	378.3	148	411.0	529.0
24	66.7	85.6	66	183.4	235.9	108	300.0	386.0	150	417.0	535.0
26	75.0	92.9	68	188.9	243.0	110	305.6	393.0	155	431.0	554.0
28	77.8	100.0	70	194.5	250.0	112	311.1	400.0	160	445.0	572.0
30	83.4	107.1	72	200.0	257.2	114	316.5	407.5	165	458.0	589.0
32	89.0	114.2	74	204.9	264.2	116	322.1	414.3	170	472.0	607.0
34	94.5	121.4	76	211.6	271.8	118	328.0	421.0	175	486.0	625.0
36	100.0	128.7	78	216.5	278.3	120	333.0	428.0	180	500.0	643.0
38	105.6	135.9	80	222.1	285.8	122	339.0	436.0	185	514.0	660.0
40	111.0	143.0	82	227.9	292.8	124	344.0	443.0	190	527.0	679.0
42	116.8	150.0	84	233.3	300.0	126	350.0	450.0	195	541.0	696.0
44	122.2	157.1	86	238.6	307.5	128	356.0	457.0	200	556.0	714.0
46	127.9	164.3	88	242.2	314.1	130	361.0	465.0			
48	133.3	171.5	90	250.0	321.7	132	367.0	471.0			
50	139.0	178.6	92	255.7	328.3	134	372.0	478.0			

AMAZONEN-WERKE

H. DREYER GmbH & Co. KG

Postfach 51
D-49202 Hasbergen-Gaste
Germany

Tel.: + 49 (0) 5405 501-0
e-mail: amazone@amazone.de
http:// www.amazone.de

Plants: D-27794 Hude • D-04249 Leipzig • F-57602 Forbach
Branches in England and France

Manufacturers of mineral fertiliser spreaders, field sprayers, seed drills, soil cultivation machines and communal units